

## Conclusion

Des souris infectées par *T. evansi* isolé de Mauritanie, du Kenya, de Chine, du Niger et du Tchad ont présenté des parasitémies et des durées de survie variables selon la souche et la concentration de l'inoculum. Les isolats Kenya, Chine et Niger se sont révélés très pathogènes. Ceux de Mauritanie et du Tchad sont peu pathogènes. Toutefois, on sait que la virulence des stocks peut être fortement influencée par des passages mécaniques, au laboratoire, ce qui pourrait expliquer en partie les différences trouvées lors de cette étude.

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**DIA (M.L.).** Comparison of the pathogenicity to mice of a stock of *Trypanosoma evansi* from Mauritania with that of stocks from Kenya, Niger, Chad and China. *Revue Elev. Méd. vét. Pays trop.*, 1995, 48 (1): 21-25

The pathogenicity to mice of a stock of *Trypanosoma evansi* from Mauritania has been compared to that of stocks from Kenya, Niger, Chad and China, using doses of 5.10<sup>5</sup>, 2.10<sup>6</sup> and 5.10<sup>6</sup> trypanosomes per mouse. The survival of mice inoculated with stocks from Kenya, Niger and China is short, on average 2.1 to 6.5 days. Mice inoculated with stocks from Mauritania and Chad survive longer, 12.5 to 22.7 days, depending on the dose.

**Key words :** Mouse - *Trypanosoma evansi* - China - Kenya - Mauritania - Niger - Chad.

## A survey of dermatophilosis in Israeli dairy cattle

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**YERUHAM (I.), ELAD (D.), NYSKA (A.).** Enquête sur la dermatophilose des bovins laitiers en Israël. *Revue Elev. Méd. vét. Pays trop.*, 1995, 48 (1) : 25-29

En Israël la dermatophilose cause de sévères lésions, en particulier chez les vaches laitières durant les premières semaines qui suivent leur primiparturition. Une baisse moyenne de 40 p. 100 de la production du lait a été constatée. Chez ces animaux, on observe une dermatite exsudative aiguë avec une réaction sévère. 580 animaux dans les troupeaux de 38 kibboutz et 15 dans 4 autres petits troupeaux ont ainsi fait l'objet d'une antibiothérapie. Tous les sujets étaient également atteints d'endométrite, de métrite ou de mammite. La forme tumorale de la dermatophilose a été observée chez les veaux jusqu'à l'âge de 3 semaines. La dermatophilose était particulièrement visible (89,4 p. 100) chez les troupeaux dans lesquels on pratiquait des douches intensives des vaches laitières durant le printemps et l'été, comparativement aux petits troupeaux où la morbidité est plus basse (6,6 p. 100). La morbidité était plus élevée dans la plaine côtière méditerranéenne (66,3 p. 100) que dans les régions arides ou semi-arides (Negev et vallée de l'Arava) dans le sud d'Israël (3,7 p. 100). Les auteurs décrivent 5 formes cliniques de la dermatophilose ainsi que les aspects épizootiologiques de la maladie chez les troupeaux israéliens. Pour conclure, une diminution du risque de la maladie peut être obtenue en réduisant la fréquence et l'intensité des douches pratiquées actuellement dans les kibboutz.

**Mots clés :** Bovin - Bovin laitier - Dermatophilose - Enquête - Epidémiologie - Bactériologie - Histopathologie - Production laitière - Israël.

## Introduction

Dermatophilosis is a contagious skin disease caused by *Dermatophilus congolensis*. The disease is a non-pruritic disease, characterized by exudative, proliferative or hyperkeratotic dermatitis, accompanied by the production of crusts and folliculitis (14). The causative agent of dermatophilosis is a Gram-positive microorganism belonging to the class *Actinomycetales*, family *Dermatophilaceae*, genus *Dermatophilus*. It is highly resistant to environmental factors (9). The life cycle, morphology and culture characteristics of *D. congolensis* have been described (18). Different clinical forms of dermatophilosis in cattle have been described (5, 7, 11, 21).

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TABLEAU I  
Characteristics of the different clinical forms of dermatophilosis

Clinical form	Number of affected herds	Course of disease	Morbidity in affected herds	Animals affected
Exudative	42	Acute	Up to 65 %	Calves, first-calving cows
« Wet look »	32	Chronic	Up to 30 %	Cows
Nodular	3	Chronic	Sporadic	Cows and bulls
Leproid	1	Chronic	Sporadic	Bulls
Tumorous	3	Acute	Sporadic	Calves up to 3 weeks of age

Dermatophilosis has a worldwide distribution by seems to be more prevalent in tropical and subtropical regions, where it causes losses due to morbidity, mortality, and decreases in milk yield and hide quality (10, 15). This study describes the clinical and epizootiological aspects of dermatophilosis, as well as the 5 forms of the disease observed in dairy herds in Israel.

## Material and methods

### Epizootiological and clinical survey

A total of 145 Israeli-Holstein dairy herds (85 kibbutz herds and 69 family herds) and an artificial insemination station comprising 80 bulls, were selected at random for this survey, which was carried out from 1982 to 1991. Each herd was visited four times per year, once per season, and all animals were examined. The clinical form and course of the disease and the morbidity rate were noted according to the type and spread of the lesions, loss of condition and milk yield. The presence of other skin diseases and infestation with ectoparasites were also assessed during these visits.

Milk production, fertility and all herd diseases were recorded. In 25 kibbutz herds, all data were recorded by computerized dairy management systems. Lactating dairy cattle are showered during the spring and summer months to cool them and lower their heat stress. The showering, which is implemented 3 to 5 times daily and is used mainly under kibbutz-type management, was given special consideration due to the potential direct impact it might have on the epizootiology of dermatophilosis. Each showering lasts 15 to 20 min and is performed while the animals are crowded in the waiting yard. Dairy cattle in Israel are kept under a zero-grazing management system. Ectoparasite control in those herds is not routinely performed.

### Histopathological examination

Skin biopsies (n = 243) were taken from three affected animals per herd using a skin punch, and fixed in 10 % buffered formalin. The histopathological specimens were stained with haematoxylin eosin.

### Bacteriological examination

Direct microscopic examinations were made on slides prepared from the crusts and stained with Giemsa (14). The typical hyphae-like forms of *D. congolensis* showed various degrees of transverse and longitudinal septation.

Three samples per infected herd (n = 245) were also subjected to bacteriological culture using the method of Abu-Samra (1). Microorganism identification was confirmed by microscopic examination of Giemsa-stained isolates.

## Results

### Epizootiological and clinical survey

Dermatophilosis was diagnosed in 76 kibbutz herds (89.4 %) comprising 200 to 300 lactating cows each, in 4 family herds (6.6 %) comprising 30 to 50 lactating cows each, and in 9 bulls held at the artificial insemination station. Five clinical forms of the disease were observed (table I).

1. The acute exudative form (fig. 1): lesions on affected animals were localized on the body surface. Hair loss and



Figure 1: A cow with the acute exudative form of dermatophilosis. Encrustation of the exudate irregular epidermal thickening (arrow).

generalized erythema were observed in the affected areas. The remaining hair tended to form tufts while the skin later thickened and took on a puckered appearance. The clefts of these folds contained serous exudate. Pus-tules were often seen on the udder. The lesion appeared to cause considerable distress to affected animals which often displayed anorexia, weight loss, mild pyrexia and a drop in milk yield. A disagreeable odour was present in many instances.

This form was observed in 38 on kibbutz farms ( $\bar{X} = 44.2$ ,  $SD \pm 11.2$ ), and four on family farms ( $\bar{X} = 9.5$ ,  $SD \pm 1.73$ ) which also practised showering of cows in the waiting yard. The morbidity rate was especially high, reaching up to 65 % in herds located in the Coastal Plain.

In the kibbutz herds, 514 (32 % of the affected animals) first-calving cows reacted severely and were treated with antibiotics. In the family, the corresponding figure was 15 (38 %).

2. The "wet look" form: affected areas of skin, mainly in the lumbar and sacral regions, became matted with a thick exudate which hardened when dry, and was often held in place by tufts of hair, presenting a "paintbrush" appearance. The matted hair could be easily detached. This form was observed in 32 kibbutz herds ( $\bar{X} = 66.2$ ,  $SD \pm 12.14$ ) throughout the year.

3. The nodular form (fig. 2): wart-like nodules appearing mainly in the lumbar and sacral regions were raised 0.5-0.75 cm above the skin surface and were about 1-2 cm in diameter, grey in color and of a hard consistency. This form was observed in four Israeli-Holstein bulls (4 % infection rate) held at the artificial insemination station located on the Coastal Plain, and sporadically in two cows from two family herds.

4. The leproid form (fig. 3): this pattern was characterized by an increase in the skin's thickness, especially in the perineal and perianal regions. The skin became rough and alopecia was observed on the lesions. This form was diagnosed in 5 Israeli-Holstein bulls (6.3 % infection rate) held at the artificial insemination station.

5. The tumorous form: this form resulted from an accumulation of cutaneous cornified material forming multiple tumorous structures 2 to 3 cm in diameter over the body surface. This condition appeared sporadically in three calves up to 3 weeks of age on three dairy farms. These animals were treated with antibiotics.

Extensive involvement of the skin (exudative form in first-calving cows) resulted in a gradual loss of condition and decreased milk production (by 40 % on average). In contrast, the chronic forms of dermatophilosis ("wet look", nodular and leproid forms) did not affect general condition or milk yield. These conclusions arise from our follow-up of the affected herds during the survey period. Pruritus was not observed and remission was spontaneous upon cessation of the showering. A high rate of morbidity (up to 65 %) was observed in first-calving cows

affected with the exudative form of the disease, 4 to 6 weeks *post partum*. Dermatophilosis was mainly prevalent during the spring and summer months (96 %), which are relatively hot (28-35°C) and humid (80-85 %) in the Coastal Plain. In addition, showering is practised in this area during this period. During the autumn and winter months, the prevalence of dermatophilosis decreased markedly, although a few cases of the "wet look" form were still observed. New cases were observed in 58 of the surveyed herds in two forms - exudative in first-calving cows and "wet look" in older cows. The disease was seldom diagnosed (three herds, 3.7 %) in the arid and semi-arid regions of Israel (Negev and Arava Valley).

All examined herds were free from ticks, 32 % of the herds were infested with chorioptic mange (*Chorioptes texanus*) and 65 % of the examined herds were infested with lice *Haematopinus quadripertusus*, *Solenopotes capillatus* and *Damalinia bovis*.

### Histopathological examination

Two histopathological forms of the disease were distinguished:

1. The acute form was characterized by suppurative dermatitis, congested oedematous epidermis infiltrated with neutrophils, and micro-abscess formation. The epidermis was covered with encrusted exudate (exudative form) and hyperkeratotic debris (tumorous form). The epidermal layer and the hair follicles were invaded by morphologically distinct filamentous bacteria consistent with *D. congolensis* (13).

2. The chronic forms were characterized by extensive mononuclear cell infiltration with proliferative changes including parakeratosis, hyperkeratosis, acanthosis and dermal sclerosis. There were no histopathologic differences between the leproid and nodular forms. The "wet look" form was characterized by mononuclear cell infiltration and slight superficial dermatitis.

### Bacteriological examination

Colonies of *D. congolensis* appeared after 48 h and were small, haemolytic, adherent and rough, digesting the agar substrate: 218 samples were positive and 25 negative.

### Discussion

*D. congolensis* has been isolated from the integument of various animals and can exist in quiescent form until exacerbation occurs when climatic conditions are favorable for its infectivity (4). Excessive exposure to water, high temperature and humidity, arthropod infestation, poor nutritional status, stress and concurrent infections may predispose animals to clinical dermatophilosis (6, 8). Although dermatophilosis affects animals of various ages (7, 19), the disease is more severe in younger animals.



## Communication

In the present survey, the most severe cases of dermatophilosis were in the form of acute exudative dermatitis and were observed in first-calving cows, 4-6 weeks *post partum*, in farms located mainly in the Coastal Plain. In addition to the hot and humid climate in this region and the practice of intensive showering, stress factors such as parturition and concurrent disease, including endometritis/metritis and/or mastitis, might also have predisposed the animals to infection (10, 15).

The absence of ticks in dermatophilosis-infected dairy herds, and the absence of dermatophilosis in beef cattle, which are usually infested with these parasites, seem to exclude ticks as a predisposing factor to infection in the dairy herds surveyed, in contrast to reports from other countries (12). Moreover, we found no correlation, as been reported by other authors, between *D. congolensis* and pox virus (6) or bovine papular stomatitis (17) infections.

The results of this survey indicate a somewhat higher incidence of the acute versus chronic forms of dermatophilosis in Israel (table I) than that found in other countries

(11). Exudative and tumorous forms were observed in calves as early as two days *post partum*. Similar early infections have been described by Smith *et al* (19) and Bida and Dennis (2). The exudative form was characterized by a high rate of morbidity in young animals (10 to 30 %), whereas cases of tumorous forms were only sporadic.

Other forms of *D. congolensis* infections reported by various authors, namely oral granulomas (5), testicular dermatitis (7), and subcutaneous and lymph node granulomas (3), have so far not been observed in Israel.

Prolonged exposure of the skin to water may result in damage to the epidermis, and depletion of cutaneous secretions (which exhibit bacteriostatic activity), modifying the skin's microflora and decreasing resistance to infection. The effect of showering at high pressure and volume is similar to skin rinses with lipid solvents (16), in that both remove the sebaceous film from the epidermis. The high incidence of dermatophilosis in kibbutz herds, where intensive showering is practised, especially in



Figure 2 : A cow with the chronic nodular form of dermatophilosis. Nodules appear horny and wart-like (arrow).



Figure 3: A bull with the chronic leproid form of dermatophilosis. Note the skin's thickness in the perineal and perianal regions - the skin becomes rough and alopecia occurs on the lesions (arrow).

humid regions, indicates the importance of this factor in predisposing dairy cattle, and in particular first-calving cows, to acute dermatophilosis in Israel. This conclusion is reinforced by the comparison of herds under different management systems-family farms where cows are not showered versus kibbutz farms where showering is practised.

The influence of climate on the incidence of dermatophilosis in Israel is demonstrated by the low incidence of the disease in the southern arid or semi-arid regions compared with the more humid northern and central regions (Coastal Plain, Galilee and Jordan Valley).

A decrease in showering intensity and duration in the period post parturition, the isolation of first-calving cows by grouping them separately, and the avoidance of animal crowding are therefore recommended as means of decreasing dermatophilosis morbidity rates in dairy herds raised under intensive management systems, such as those used in Israel.

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In Israel, dermatophilosis was found to inflict severe lesions, especially in first-calving cows during the first weeks post-parturition. Decreased milk production (by 40 % on average) was also noted. Acute exudative dermatitis was observed in these animals. Severely reacting animals (570 in 38 kibbutz herds and 15 animals in 4 family herds) were treated with antibiotics. All these animals also suffered either from endometritis/metrinitis or mastitis. The "tumoral" form of dermatophilosis was observed on 3-week-old or younger calves. Dermatophilosis was especially prevalent (89.4 %) in dairy herds in which intensive showering of lactating cows is practised during the spring and summer months, in comparison to the family herds where the morbidity rate was lower (6.6 %). Morbidity rates were found to be higher in the humid Mediterranean Coastal Plain (66.3 %) than in the arid or semi-arid regions (Negev and Arava Valley) of Southern Israel (3.7 %). Five clinical forms of dermatophilosis and the epizootiological aspects of the disease in Israeli dairy herds are described. It is concluded that a reduction in the prevalence of dermatophilosis could be achieved by decreasing the frequency and the intensity of showering currently applied under the kibbutz management system.

**Key words :** Cattle - Dairy cattle - Dermatophilosis - Survey - Epidemiology - Bacteriology - Histopathology - Milk production - Israel.