

# Contagious ecthyma associated with myiasis in sheep

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## Summary

A severe outbreak of contagious ecthyma (orf) is described in sheep in Saudi Arabia. In some of the affected sheep, the condition was highly aggravated by myiasis which appeared to have been favoured by the abundance of flies during the hot season. The outbreak is discussed in relation to the epidemiology of the disease in Saudi Arabia.

## Keywords

Contagious ecthyma – Epidemiology – Myiasis – Orf – Saudi Arabia – Sheep.

## Introduction

Contagious ecthyma, also known as orf or contagious pustular dermatitis, is an infection of sheep and goats which is caused by a parapoxvirus of the family *Poxviridae* (orf virus) (5). The classical clinical disease is usually manifested as scabby lesions around the mouth (7). The lesions are initially erythematous spots or swelling, and this is followed by formation of papules which become bigger and pustular with a yellowish creamy appearance. These papules progress to develop into scabs (4). Other forms of the disease are also observed. These may involve other parts of the skin, including the face, udders, ears and under the tail (2). Generalised infection has also been reported (1).

Although contagious ecthyma infection in sheep and goats is usually self-limiting, a long-lasting condition (1) or a susceptibility to mastitis (A.A. Gameel *et al.*, unpublished findings) could result, if infection is complicated by other conditions.

The authors report an outbreak of contagious ecthyma involving sheep, in which some animals suffered from severe complications of the condition, due to myiasis (Figs 1 and 2).

## Materials and methods

### The disease

In the early summer of 1998 (April-June), several outbreaks of contagious ecthyma affected sheep in Al-Ahsa, in the eastern region of Saudi Arabia. Although the disease in most cases resembled the classical form (scabby mouth), as described earlier (3), some sheep (13.8%) were affected by an aggravated form. Clinical examination of these animals revealed elevated temperatures which reached 41°C. The lesions were severe, but were confined to the skin around the mouth, the gums and the inner surface of the lips. The lesions had an offensive odour. Fissures associated with inflammation were seen on the lips and gums. On closer examination, insect larvae were observed to be burrowing into the fissures. The affected sheep were aged between four and twelve months.

### Affected animals

Contagious ecthyma was observed in two local breeds of sheep, Naimi and Najdi. The Naimi is also known as Awassi and is characterised mainly by its white body and black or red head. Long, curly wool covers most of the body, and is less dense on the belly. The hind legs are covered with short wool down to the hocks. Naimi wool is noted to have varying percentages of coarse, fine and kemp fibres in ewes and lambs





**Fig. 1**  
Severe contagious ecthyma lesions around the mouth and nostrils of a Naimi lamb with larvae infestation of the lower lip

(6). The Naimi is bred in Saudi Arabia for both milk and meat production. The second of the affected breeds was the Najdi, named after the central region of the country. The breed has a black body, sometimes with a few white patches around the head. This breed has very long wool fibres and is used for meat production only (mutton).

### Treatment

The animals with myiasis were kept at the King Faisal University Veterinary Hospital and were given intramuscular supportive treatment with 1% dextrose and multi-vitamins. Negasunt powder was applied to the wounds to kill the larvae. All the larvae died within 24 h of the application of the powder, and injections of noramidopyrazoline (0.8 g) reduced the high temperature. The animals also received tylosine (200 mg) intramuscularly for five days. The scabs disappeared and complete healing was achieved within thirty-eight days of admission.

When the condition of the animals was confirmed as completely stable, the animals were discharged. However, the animals were remarkably emaciated, indicating the severity of the disease. Any animals suffering from a similar condition could die unless close supervision and care is provided.

### Laboratory investigations

Material from the scabs was collected and prepared as 10% and 50% suspensions in F-12 medium, pH 7.4, without serum. The 10% suspension was clarified by centrifugation at 2,300 g for 15 min. Antibiotics were added to the supernatant (3) and this was inoculated onto primary lamb testicle (PLT) cell culture and then adapted to Vero cell culture (3).

### Virus identification

Hyperimmune serum produced in rabbits against the Makkah strain of the orf virus (3) was used in both the agar gel immunodiffusion (AGID) and the serum neutralisation test (SNT).



**Fig. 2**  
Emergence of a larva from the lower lip of Najdi sheep infected with orf virus

For identification of the orf virus, the 50% suspension was employed in the AGID, as described by Housawi and Abu Elzein (2).

The virus strain isolated in cell culture was further identified using the micro SNT, as described by Housawi *et al.* (4), based on the method of Trueblood *et al.* (8).

Non-immune rabbit serum was included in both the AGID and SNT experiments, as a negative control.

## Results

The inoculated PLT cell culture showed cell rounding at three days post inoculation, which separated from the cell monolayer on the fifth day post inoculation.

Control cells remained healthy. The virus isolate adapted well to Vero cell culture, and was completely neutralised by the hyperimmune serum in this culture.

A precipitation line was produced between the virus contained in the 50% suspension and the orf virus hyperimmune serum. This line completely merged with a line produced between the hyperimmune serum and the known Makkah strain of orf virus isolated previously (3). Non-immune rabbit serum did not react in the test.

Flies of the pupated larvae were identified as *Lucilia sericata* (green blowflies).

## Discussion

Since the 1990s, experience of contagious ecthyma among sheep and goats in Saudi Arabia has showed that the classical form, which involves the area around the mouth and the



buccal cavity, is the most predominant (3). However, some other forms have been recorded, such as that involving the ears (2), the entire body (6) or the udders (A.A. Gameel *et al.*, unpublished findings). The present paper describes an unusual form of contagious ecthyma infection which was associated with myiasis.

The larvae burrowed through the raw tissues around the mouth, gums and nostrils, where the contagious ecthyma lesions were present, thereby greatly aggravating the condition (Figs 1 and 2).

This aggravated condition was observed during early summer (April-June) when flies are abundant, due to the warm temperatures. Flies were attracted to the contagious ecthyma lesions and deposited eggs inside. The resulting larvae developed, causing much damage in the area of the lesion.

Furthermore, the migrating larvae could aid the orf virus to spread deep into the tissues. Such a situation might lead to evolutionary developments regarding the pathogenesis of the orf virus, which is usually epitheliotropic (6). However, the consequences of such an introduction and the possible adaptation of the orf virus to the inner muscle tissues are unknown.

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## Ecthyma contagieux du mouton, associé à des myiases

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### Résumé

Les auteurs décrivent une grave épizootie d'ecthyma contagieux survenue chez les moutons en Arabie saoudite. Chez certains ovins, la maladie a été fortement aggravée par des myiases dont l'apparition semble avoir été favorisée par l'abondance des mouches pendant la saison chaude. Les auteurs décrivent cet épisode en le replaçant dans le contexte de l'épidémiologie de la maladie en Arabie saoudite.

### Mots-clés

Arabie saoudite – Ecthyma contagieux – Épidémiologie – Myiase – Ovins.

## Ectima contagioso asociado con miasis en la oveja

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### Resumen

Los autores describen un grave brote de ectima contagioso que afectó a ovejas de Arabia Saudí. El estado de algunos de los animales enfermos vino a agravarse por la presencia de miasis, favorecida según todos los indicios por la abundancia de moscas durante la estación cálida. Los autores examinan este brote y su relación con la epidemiología de la enfermedad en Arabia Saudí.

### Palabras clave

Arabia Saudí – Ectima contagioso – Epidemiología – Miasis – Ovejas.

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