

# Camel contagious ecthyma: Risks in young calves

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## Key words

Dromedary - Young animal - Contagious ecthyma - Sudan.

## Summary

Camels are important animals uniquely adapted to dry and arid environment. High calf mortality appears to be one of the major constraints to optimum productivity in camels. Camel contagious ecthyma (CCE) is a sparsely studied disease caused by a *Parapox* genus virus of the Poxviridae family. In Sudan, about 98% of CCE cases occur in calves less than one year old with 60-100% morbidity and 9-38% mortality rates. The disease is endemic in most parts of Sudan where camels are raised with variations in intensity of infection and mortality rates. The disease reappears regularly every year in the early rainy season (July-August) affecting camel calves in their first autumn of grazing. CCE lesions are confined to the head, in particular to the lips, nostrils and eyes, without becoming generalized. These lesions are characterized by a distinctive feature, i.e. the appearance of fissured crusts that clinically differentiate the disease from camel pox or papillomatosis. The disease affects the growth rate of camel calves by interfering with their ability to suckle or graze. The economic impact of this poorly studied disease is discussed. CCE needs to be seriously considered as one of the factors that affect camel productivity in Sudan.

## ■ INTRODUCTION

Camels are important animals uniquely adapted to a dry and arid environment. For centuries, men have used them for meat, milk, wool, hide and draught power. The importance of camels in the supply of animal proteins in arid and drought-stricken areas such as the Horn of Africa cannot be overemphasized.

Camels are considered slow reproducers. In pastoral systems calving interval is usually 24 months or even more. In view of this fact, camel mortality possesses an added effect that limits camel productivity. High calf mortality appears to be one of the major constraints to higher productivity in camels. Wilson (11) emphasizes the high rate of camel calf mortality and describes this problem as one of the limiting factors affecting the growth rate of camel herds. Many factors contribute to calf mortality, among which are diseases. Therefore, research on diseases affecting young camels are urgently needed to reduce the high rate of death

among camels. In Sudan camel contagious ecthyma (CCE) is regarded as an important cause of loss of calves (5, 6).

In this presentation a brief account is given of CCE, its causative agent, spread, affected age groups, treatment and control in Sudan. Records on the occurrence of CCE in three herds over 10 years (1987-1996) are presented and discussed.

## ■ CAMEL CONTAGIOUS ECTHYMA

Camel contagious ecthyma is a highly contagious viral disease of young animals. This disease was first described in Kazakhstan in 1968 (3) and has since been described in Mongolia (4), Kenya (10), Somalia (9), Libya (2), India (8) and Sudan (1, 5). It primarily affects young animals exhibiting most regularly localized lesions and frequently generalized changes that resemble camel pox (10). It was formerly thought to be a form of camel pox since clinical symptoms of both diseases are similar. However, camel herders in many countries regard CCE as a separate disease and give it local names such as *Auzdic* in Kazakhstan (3) and *Abu Shalambo* and *Al Kolate* in Sudan (1, 5). Clinically, nodules first appear on the lips of affected animals followed in most cases with swelling of the face and sometimes the neck (figure 1). Papules and vesicles appear later. They develop within few days into thick scabs and fissured crusts (figures 2 and 3).

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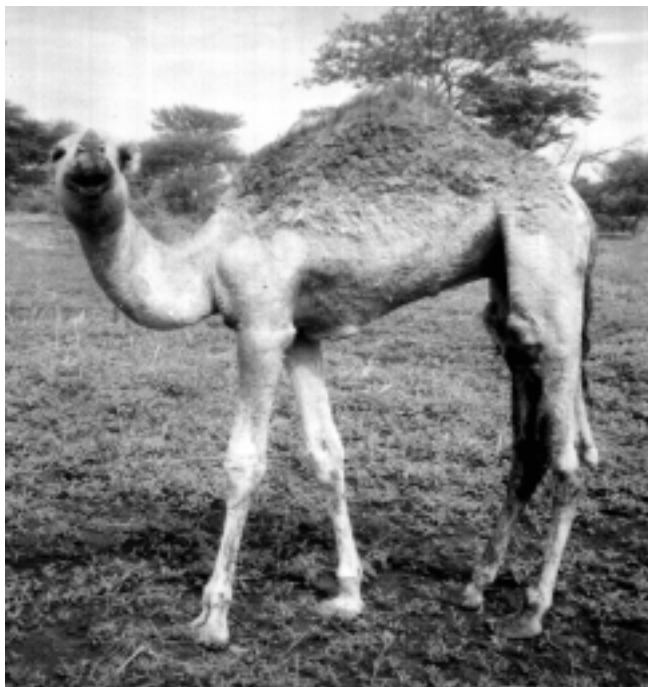


Figure 1: Camel presenting signs of contagious ecthyma.



Figure 2: Side view of the head of a camel presenting signs of contagious ecthyma.

### ■ CAUSATIVE AGENT

A virus that belongs to the *Parapox* genus of the family Poxviridae causes camel contagious ecthyma. Camel *Parapox* virions are ovoid particles that range in size from 230 to 360 x 131 to 160 nm, their axis ratio is about 1:1.56 and their surface shows a regular crisscross pattern of filaments (figure 4). During its long term course, the disease is complicated by bacterial and fungal contamination (1, 5, 10).

### ■ ECONOMIC IMPACT OF CCE

It is difficult to accurately assess actual annual losses due to CCE owing to the nomadic nature of camel production. The disease is not only a cause of calf mortality, but also affects camel performance with weight loss and severe reduction in milk production, since she-camels cease to lactate when their calves die.



Figure 3: Front view of the head of a camel presenting signs of contagious ecthyma.



Figure 4: Camel Parapox virions.

### ■ HOW THE DISEASE SPREADS

Camel contagious ecthyma is endemic in most camel raising areas of Sudan (5, 6). Transmission of CCE occurs through direct and indirect contacts. In most investigated outbreaks in Eastern Sudan, the infection occurs as a result of direct contacts between sick and susceptible animals. Watering the animals in boreholes (*hafaers*) provides opportunity for infection transmission. Skin abrasion of the lips caused by browsing *acacia* trees seems to represent the major predisposing factor to CCE. Buchnev *et al.* (3) argue that the thorny plants damage the lips allowing transmission of the parapoxvirus. Movements of camels during the rainy season have a significant role in the spread of CCE in Eastern Sudan, and insects have also been incriminated in the spread of the disease (6).

### ■ AGE GROUPS AFFECTED

All cases of CCE in Eastern Sudan occurred in young camels up to three years old. Most of the cases (71%) occurred in animals aged 7-12 months and 27% of the cases were in the age group 0-6 months. Four animals aged 1-2 years and two animals aged three years accounted for only 2%. This means that 98% of the cases occurred in calves less than one year old, making under one-year-old calves the most susceptible age group.

## ■ CAN CONTAGIOUS ECTHYMA BE TREATED?

There is no specific treatment for CCE. As most nomads in Sudan and probably elsewhere deny the infectious nature of CCE, the disease is either allowed to take its natural course or traditional treatments are applied. Traditional treatments include cauterization of regional lymph nodes, application of sesame oil and hot milk and sometimes plant tar. Antibiotics given for 3-5 days prevent a secondary bacterial infection and reduce the severity of the infection.

## ■ CAN CONTAGIOUS ECTHYMA BE CONTROLLED?

If programs for effective control of CCE are to be applied, sanitary measures for infectious diseases are important. These must include quarantine of infected areas, restriction of camel movements, management of drinking water and avoidance of skin abrasions. These measures are difficult to implement owing to the migratory pattern of camel production in Sudan and the difficulty to reach camels especially during the rainy season. Like all other viral diseases, CCE is better prevented than treated. Attention should therefore be directed towards vaccine production. The causative virus was recently isolated in cell culture (7); this is expected to lay the ground for the production of a cell culture attenuated or inactivated vaccine. The implementation of a nationally approved program for CCE control is much needed.

## ■ RETROSPECTIVE EVALUATION OF CCE RISK IN YOUNG CAMELS

Tables I, II and III show the pattern of CCE outbreaks in three camel herds from ecologically different zones in Sudan, namely Kassala, Southern Butana and Blue Nile areas.

The disease occurred in the three herds every year with varied morbidity and mortality rates. The incidence and severity also varied depending on the location. The susceptible animals were young calves less than one year old in their first autumn of grazing. Older animals, which had experienced the disease, did not

Table I

Cases of camel contagious ecthyma recorded in Herd 1, Kassala area (1987-1996)

Year	Total num. of calves*	Num. of calves affected with CCE	Num. of calves dead	Mortality rate %
1987	6	6	0	0
1988	7	5	0	0
1989	10	7	0	0
1990	12	10	1	8
1991	10	7	2	20
1992	4	4	0	0
1993	6	6	0	0
1994	9	7	0	0
1995	12	10	0	0
1996	14	12	0	0
Total	90	74	3	3.3

\* Camel calves less than one year old

succumb to it, except those that had escaped previous exposure. It was found that herds in areas such as Blue Nile, with heavy rainfall characterized by abundance of *acacia* trees, showed relatively higher morbidity and mortality rates. On the other hand, in areas such as Kassala and Northern Butana, which received light rainfall, the disease caused mild infection with very little mortality.

Table II

Cases of camel contagious ecthyma recorded in Herd 2, Southern Butana area (1987-1996)

Year	Total num. of calves*	Num. of calves affected with CCE	Num. of calves dead	Mortality rate %
1987	4	4	1	25
1988	9	9	0	0
1989	8	7	0	0
1990	10	10	5	50
1991	3	3	2	67
1992	3	3	1	33
1993	7	6	2	29
1994	8	8	1	13
1995	6	6	1	17
1996	8	8	0	0
Total	66	64	13	20

\* Camel calves less than one year old

Table III

Cases of camel contagious ecthyma recorded in Herd 3, Blue Nile area (1987-1996)

Year	Total num. of calves*	Num. of calves affected with CCE	Num. of calves dead	Mortality rate %
1987	12	12	4	33
1988	14	14	6	43
1989	14	14	2	14
1990	15	14	9	60
1991	8	8	6	75
1992	9	9	3	33
1993	11	11	4	36
1994	13	11	5	38
1995	11	10	3	27
1996	13	13	3	23
Total	120	116	45	38

\* Camel calves less than one year old

## ■ CONCLUSION AND PERSPECTIVES

Calf mortality is the most important factor affecting herd growth and productivity in camels. Significance of CCE in Sudan is emphasized by the substantial annual losses of young camels. The disease appears as a major problem in young camels in humid parts of the country such as Southern Butana and Blue Nile areas. From the findings of this study, the major factors associated with increased likelihood of CCE occurrence are

season of the year, camel age, camel movements and location and their association with thorny *acacia* trees. The causative virus has been isolated in cell culture and efforts have to be pursued to study its physicochemical and biological properties. It is also important to study the camel immune response to natural and experimental infection as well as virus antigenicity. Furthermore, future research should focus on the development of effective control measures.

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## Résumé

**Khalafalla A.I.** Ecthyma contagieux du dromadaire : risques chez le chamelon

Les dromadaires sont des animaux de grande importance, exceptionnellement adaptés aux zones sèches et arides. Le taux de mortalité élevé des chamelons apparaît comme l'une des principales contraintes à la productivité optimale du dromadaire. L'ecthyma contagieux du dromadaire (Ecd) est une maladie peu étudiée due à un virus du genre *Parapox* de la famille des Poxviridae. Au Soudan, 98 p. 100 des cas d'Ecd se produisent chez des chamelons de moins d'un an avec des taux de morbidité de 60 à 100 p. 100 et de mortalité de 9 à 38 p. 100. La maladie est endémique dans la plupart des régions du Soudan où il y a des élevages de dromadaires, avec toutefois des différences au niveau des taux de mortalité et de la gravité de l'infection. La maladie réapparaît régulièrement chaque année au début de la saison des pluies (juillet - août), affectant les chamelons à l'automne lors de leur première mise au pâturage. Les lésions d'Ecd ne sont pas généralisées mais restreintes à la tête, notamment sur les lèvres, les naseaux et les yeux. Ces lésions sont caractérisées par la présence de croûtes fissurées qui permettent de distinguer cliniquement cette maladie de la variole cameline ou de la papillomatose. Elle affecte la croissance du chamelon en diminuant sa capacité à téter ou à brouter. L'impact économique de cette maladie peu étudiée est discuté. Il apparaît que l'Ecd doit être sérieusement étudié compte tenu de sa répercussion sur la productivité du cheptel camelin au Soudan.

**Mots-clés** : Dromadaire - Jeune animal - Ecthyma contagieux - Soudan.

## Resumen

**Khalafalla A.I.** Ectima contagioso en el camello y sus riesgos en los camellos jóvenes

Los camellos son animales importantes, particularmente adaptados a un medio ambiente seco y árido. Una mortalidad elevada del joven parece ser uno de los mayores obstáculos para una productividad óptima en los camellos jóvenes. El ectima contagioso del camello (CCE) es una enfermedad poco estudiada, causada por un virus del género *Parapox* de la familia Poxviridae. En Sudán, aproximadamente 98 % de los casos de CCE se presentan en jóvenes de menos de un año de edad, con tasas de morbilidad de 60-100 % y de mortalidad de 9-38 %. La enfermedad es endémica en la mayor parte de Sudán, en donde los camellos son criados con una severidad variable de las tasas de infección y de mortalidad. La enfermedad aparece regularmente cada año, temprano durante la estación lluviosa (julio-agosto), afectando camellos jóvenes durante su primer otoño en pastoreo. Las lesiones de CCE se encontraron confinadas a la cabeza, en particular a los labios, ollares y ojos, sin llegar a ser generalizadas. Estas lesiones se caracterizan por un hecho distintivo, como la aparición de costras fisuradas, que permiten diferenciar clínicamente la enfermedad de la viruela del camello o de la papilomatosis. La enfermedad afecta la tasa de crecimiento de los jóvenes camellos, interfiriendo con la capacidad de mamar o de pastorear. Se discute el impacto económico de esta enfermedad, raramente estudiada. El CCE debe ser seriamente considerado como uno de los factores que afectan la productividad del camello en Sudán.

**Palabras clave:** Dromedario - Animal joven - Ectima contagioso - Sudán.