



## Epidemiology and Clinical Features of Camel pox in Eastern Sudan

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### ABSTRACT.

The epidemiology and clinical features of Camel pox in the Eastern Sudan was studied. During this study 611 camels were examined, and only 85 animals were infected, 6 were died; the overall morbidity and mortality rates were 13.91 % and 1%, and case fatality rate of 7.06% respectively. The morbidity and mortality rates were found to be 40(11.14%) and 2(0.56%) in El Gadref, 45(17.86%) and 4(1.59%) in Kassala, respectively. 26(23.86%) of the infection were recorded in animals less than one year of age, while 31(34.07%) in camels aged one to two years old. 17(20.73%) in the group of two to three years old. and 11(3.34%) cases in camels more than three years of age, mortality rate of 2.75% (three animals) was reported in animals less than one year, 2.17 % (two animals) occurred in the age of one to two years, 1.22% (one animal) occurred in the age between two to three years, none of the affected animals >3 years of age died. Morbidity and mortality in males were 30(21.28%) and 4(2.84 %) respectively, whereas in females were 55(11.70%) and 2(0.423 %), respectively clinical signs were characterized by edema of the face and head, enlargement of lymph nodes, mucopurulent nasal discharge and appearance of localized and generalized pox lesions. According to the history and the clinical features of the disease, it seem Camel pox is endemic in Eastern part of Sudan.

**Keywords:** Epidemiologic, Clinical features, Camel pox.

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### INTRODUCTION

Camel pox is one of the most important camel diseases of the old world (Wernery *et al.*, 1997). It characterized by localized and generalized pox lesions and affects mostly young camels, (Wernery and Kaaden., 1995). The causative agent is Camel pox *virus* belonging to Family Poxviridae, bfamily Chordopoxvirinae, genus Orthopoxvirus (Panning *et al.*, 2004; Essbauer *et al.*, 2010). The disease has been reported from all camel rearing countries and is responsible for severe economic losses

(Bhanuprakash *et al.*, 2010). The current dromedary population in Sudan is estimated to be 4.6 million (Sudan Ministry of Animal Resources & Fisheries, 2010; <http://marf.gov.sd>). A little data were so far available concerning camel diseases as compared to other animal species. It may be due to camel production is usually practiced on a migratory system in remote areas with harsh living conditions that make such studies difficult and expensive to execute (Wernery *et al.*, 2004). The disease is characterized by fever,

enlarged lymph nodes and skin lesions. Skin lesions appear 1-3 days after the onset of fever, starting as erythematous macules, developing into papules and vesicles and later turning into pustules. Crusts develop on the ruptured pustules. These lesions first appear on the head, eyelids, nostrils and the margins of the ears. In the generalized form, pox lesions may cover the entire body. Skin lesions may take up to 4-6 weeks to heal. In the systemic form of the disease, pox lesions can be found in the mucous membranes of the mouth, respiratory and digestive tracts (Kriz., 1982; Wernery and Kaaden., 2002). Recently camel pox seemed to have a real role in ship's cargo rejection (Ahmed ELGhali and Mohammed zein, 2013). The objective of this work was to study the epidemiology and the clinical feature of the Camel pox in Eastern Sudan.

#### MATERIALS AND METHODS

**Study area:** In the Eastern part of the Sudan (El Gedaref and West Kassala) a survey of Camel pox was conducted during the period from January to May 2013. Six hundred and eleven camels were examined during this study.

**Data collection:** In addition to Serum sample, Skin biopsies and/or scabs for virus isolation attempts and for histopathology, the data including the occurrence of the disease, information

concerning host characteristics sex and age, morbidity and mortality, clinical signs, location and progress of the lesions, were collected. Animals were categorized into four groups according to age, 109 were less than one year, 91 animals were between one to two years, 82 animals were between two to three years and 329 animals were more than three years. Results and conclusion concerning to the serum and Skin biopsy has been early published in the SUST Journal of Agricultural and Veterinary Sciences under the title (Yassein *et al.*, 2014).

#### RESULTS

**Clinical findings:** During this study, 611 camels were examined for the Camel pox, only 85 animals were found to be infected with lesion suggestive of Camel pox; the clinical manifestations of Camel pox varied from local and mild to acutely generalized infections. The acutely affected camels were febrile, depressed, prostrated and anorexic. They lost weight and were emaciated with extensive mouth lesions. Also edema of face and head, enlargement of the mandibular lymph nodes, mucopurulent nasal discharge and ocular lacrimation, difficulty in respiration were recorded (Figures 1 and 2).



**Figure 1:** A camel showing papules and vesicles formation, edema of the head, and face, conjunctivitis and enlargement of the mandibular lymph nodes (arrow)



**Figure 2:** A camel showing difficulty in respiration and conjunctivitis

Papules and vesicles were observed on the lips and nostrils and later involved the whole head, neck, buttock,

abdomen, chest, legs and groin, ear, udder, tail and peri-anal areas were also affected (Figures 3 and 4).



**Figure 3:** Ten months-old female camel showing generalized vesicles and nodular lesions (papules) in abdomen, chest and inner thigh



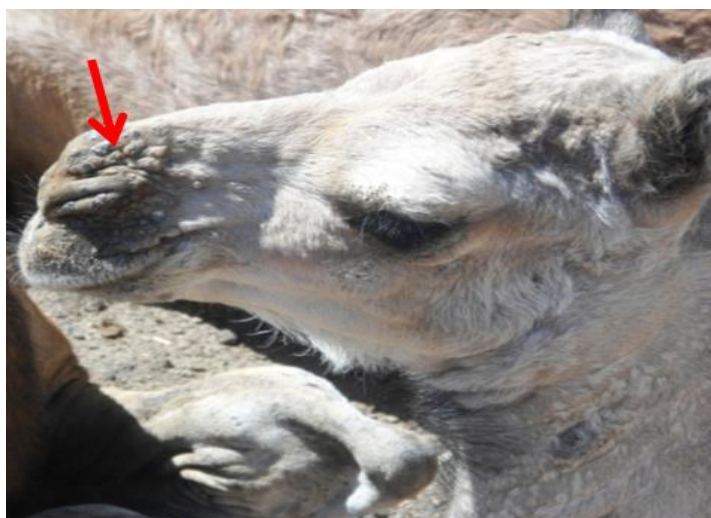
**Figure 4:** A camel showing proliferation of papules on the groin and inner thigh, udder and tail

Papules and vesicles formation were observed in infected camels and distributed over the right hind leg and thick scabs were present on the lips and nostrils (Figures 5 and 6). In some animals conjunctivitis were observed

on eyelids resulted in blindness particularly when secondary bacterial infection was recorded. Difficulty in suckling, eating and respiration were noted due to ulceration of the buccal cavity



**Figure 5:** A dromedary with nodular lesions distributed over the right hind leg of a sitting camel



**Figure 6:** A camel affected with thick scabby lesions around the lips and nostrils

**Morbidity and Mortality:** In the present survey out of the 611 camels examined for the Camel pox, the results had shown that only 85 animals were found to be infected with lesion suggestive of Camel pox. The morbidity rates were 40(11.14%) and 45 (17.9%) animals examined at El Gedaref and West Kassala respectively. While, the mortality rate of 2 (0.56%) was observed in animals from El Gedaref and 4(1.59%) in animals from West Kassala. The overall morbidity and mortality were 13.91 % and 1% respectively. As shown in Table (1). The prevalence of Camel pox virus infection and mortality rate according to age were shown in Table (2). The prevalence of Camel pox virus As far as sex is concerned, were shown in Table (3). Six of the affected animals died with

an overall mortality rate of 1% and a case fatality rate of 7.06%

**Table 1: Prevalence of Camel pox virus infection at El Gedaref and West Kassala**

Study area	Animals examined	Morbidity	%	Mortality	%
El Gedaref	359	40	11.14	2	0.56
West Kassala	252	45	17.86	4	1.59
Total	611	85	13.91	6	0.981

**Table 2: Prevalence of Camel pox virus infection in different age groups**

Age group	Animals examined	Morbidity	%	Mortality	%
>than year	109	26	23.86	3	2.75
1-2 years	91	31	34.07	2	2.17
2-3 years	82	17	20.73	1	1.22
<3 years	329	11	3.34	-	-
Total	611	85	13.91	6	0.981

**Table 3: Prevalence of Camel pox virus in Males and Females**

Sex	Animals examined	Morbidity	%	Mortality	%
Male	141	30	21.28	4	2.84
Female	470	55	11.70	2	0.423
Total	611	85	13.91	6	0.981

## DISCUSSION

Camel pox is species specific a highly contagious viral disease of Camelids. Few surveys were conducted in Sudan to investigate the prevalence of the disease in the last few decades, most of the work was located in Eastern Sudan; this may be due to the political instability and civil war in other camel rearing areas or that camel production is usually practiced on a migratory system in remote areas with harsh living conditions that make such studies difficult and expensive to execute. The morbidity and mortality rates were 13.91 % and 1%, respectively. The morbidity rate recorded was different from Khalafalla (1998) who reported that the morbidity rate of 9.1% in Eastern Sudan. It may be attributed to the availability of young susceptible animals or to the virus strain involved. On the other hand, Tarek *et al.* (2012) reported higher prevalence rate of in Egypt, the morbidity and mortality rates were 52.4 and 5.7% respectively, Dafalla and Elfadil (2007), reported 41% morbidity and a mortality of 3.6% in Jazan, Saudi Arabia. Kriz (1982) reported morbidity and mortality rates of 28% and 5.4%, respectively. While morbidity rates reach 100% in some

camel herds, mortality rates range between 0% and 2% in the mild form and 28% to 40% during severe outbreaks (Munz, 1992; Abbas & Omer, 2005; Al-Ziabi *et al.* (2007) and Bhanuprakash *et al.* (2010). The morbidity and mortality rates vary according to the geographic location, season and the strain of Camel pox virus, age structure, immunological and nutritional status of the herd, stress and intercurrent diseases. The clinical signs of Camel pox virus observed in this study are inconsistent to those described by Khalafalla. (1998) and Tarek *et al.* (2012) where the affected camels manifested itself as one form with varying degrees of severity and not two or more clinical forms as reported by Buchnev *et al.*(1987) and Kriz. (1982). Most of camels affected with Camel pox during this study were young immature animals up to three years old. Deaths attributed to Camel pox occurred in ages less than one year (2.75%), 1-2 years (2.17%), and 2-3 years (1.22%), however, no mortality was recorded in animals >three years old. Considering the sex, the infection was dominant in males (21.28 and 2.84%) rather than females (11.70 and 0.423%). Six of the affected animals

died with an overall mortality rate of 1% and a case fatality rate of 7.06%.

### CONCLUSION

The present study revealed that Camel pox is wide spread in Eastern Sudan. It is speculated that the system of herding camels in the region may facilitate the spread of infection. Along with Vaccination program, improved management and awareness of owners about the control measures would be of immense value to curtail the infection in the field and have a paramount impact in reducing the circulation of the virus.

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