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**COMPARATIVE CLINICAL AND  
EPIDEMIOLOGICAL STUDIES ON BOVINE  
EPHEMERAL FEVER IN SAKHA FARM,  
KAFR EL-SHEIKH, EGYPT**  
(With 4 Tables and 3 Figures)

By

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**دراسات إكلينيكية ووبائية مقارنة عن مرض حمى الثلاثة أيام  
في الأبقار بمزرعة سخا - كفر الشيخ - مصر**

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عنيت هذه الدراسة بالقاء الضوء على بعض الملامح الوبائية والإكلينيكية المتعلقة بمرض حمى الثلاثة أيام في محطة سخا للبحوث الزراعية التابعة لمعهد بحوث الإنتاج الحيواني في محافظة كفر الشيخ وذلك من خلال دراسة مقارنة لوبائين متتاليين الأول حدث في صيف عام ٢٠٠٠م والثاني في صيف ٢٠٠٤م في نفس المزرعة. فمن الناحية الوبائية وعلى الرغم من تطابق موسمي الوبائين ( يونيو ويوليو من العامين) إلا أن الملامح الوبائية قد تباينت فيما بينهما فكان معدل الإعياء في الأول ٤٧,٦٢% بينما كان في الثاني ٢٣,٧٧% وكانت نسبة النفوق ١,٣٥% في الأول بينما لم تحدث أية حالة نفوق في الثاني وكانت مدة الوباء الأول ٢٢ يوما بينما كانت في الوباء الثاني ٣٢ يوما. وكانت الدورة الوبائية طولها أربع أعوام. وعلى الجانب الإكلينيكي تفاوتت العلامات الإكلينيكية من وباء إلى آخر ومن حيوان إلى آخر وكانت الأعراض عبارة عن ارتفاع في درجة الحرارة وزيادة في إفراز اللعاب وخمول في حركة الكرش وإنخفاض معنوي وحاد في إنتاج اللبن مع فقدان للشهية مع صعوبة في البلع وتضخم في الغدد الليمفاوية وعرج وأحيانا رقاد بعض الحيوانات. هذا وكانت المظاهر في مجملها أشد ضراوة في الوباء الأول حيث ظهر العديد من المضاعفات من بينها وجود إستفاخات هوائية تحت الجلد ورقود الحيوان الدائم والتي إنتهت بنفوق بعضها (٨ حيوانات) حيث كانت الصفة التشريحية لها عبارة عن وجود تضخم في الغدد الليمفاوية وتسريبات هوائية تحت الجلد في مناطق تحت الفك السفلي والرقبة والظهر مع وجود إمفيزيما وإحتقان في الرئة. بالإضافة إلى ذلك كانت هناك سوائل إرتشاحية في كل من الغشاء البلوري والغشاء البروتوني وأيضا في غشاء التامور. أما في الوباء الثاني فلم تحدث أية مضاعفات ولم تسجل أية حالات نفوق.

## SUMMARY

Bovine ephemeral fever (BEF) is an endemic disease in Egypt, where several epidemics were occurred in the last 15 years. So, this study was aimed to discuss some epidemiological and clinical aspects related to the disease in Sakha station, Kafr El-Sheik, Egypt. Observational studies in 2004 were compared to outbreak, 2000 in the same farm. Clinical signs varied from animal to animal but collectively clinically infected animals showed high fever, anorexia, ruminal atony, depression, shivering, excessive salivation, respiratory distress, ataxia, lymph node enlargement and lameness with stiffness in one or more limbs with recumbency in some animals. The morbidity rate was higher (47.62%) in outbreak, 2000 than that recorded in outbreak, 2004 (23.77%). Moreover, in outbreak, 2000, the mortality rate was 1.35% and the case fatality rate was 2.84% whereas the recovery rate was 100% in outbreak, 2004. Concerning the disease seasonality, the two studied outbreaks occurred in summer months. The infection rate was greater in female than male animals in both outbreaks. The incidence of the disease was lower in young animals than that in adult ones. Moreover, the disease was more severe in adult heavy weighted animals.

*Key words: Bovine ephemeral fever, epidemiology, clinical study.*

## INTRODUCTION

Bovine ephemeral fever (BEF) is non contagious viral disease of cattle and water buffaloes caused by arbovirus of the family Rhabdoviridae (Mathews, 1982).

All BEF epidemics occurred in Summer months when insect vectors are active (St-George *et al.*, 1993 and Coetzer *et al.*, 1994). The disease has occurred in African continent, Asia, East India and Australia (St-George, 1988 and Radostits *et al.*, 2000).

In Egypt, the disease was first described by Piot (1896) and Rabagliati (1924). Moreover, several recent epidemics were reported in Summer 1991, 1994 and 2000 by Hassan *et al.* (1991); Soheir *et al.* (1994) and Soad *et al.* (2001).

Great economic losses were attributed to the disease in the form of decreased body weight, fall in milk production, mastitis, abortion as well as expenses of treatment (Theodoridis *et al.*, 1973; Sharma, 1992; Coetzer *et al.*, 1994 and Radostits *et al.*, 2000).

The aim of the present work was delineated to a comparative study of some epidemiological and clinical aspects of a two successive outbreaks of BEF in cattle in Sakha station, Kafr El-Sheikh, Egypt.

## **MATERIALS and METHODS**

### **1- Animals:**

A total number of 408 Friesian cattle of different ages and sexes belonging to Sakha station, Kafr El-Sheikh Governorate were subjected to clinical examination according to Rosenberger (1990) and serologically against BEF using virus neutralization test (VNT) according to Carbery and Lee (1966) during year, 2004. Moreover, a case control study (retrospective) in the same farm concerning the same disease during year, 2000 was compared to our data.

### **2- Post mortem examination:**

Post mortem examination was carried out on the dead animals.

### **3- Statistical analysis:**

The obtained data was analyzed according to Snedecor and Cochran (1980).

## **RESULTS**

### **Clinical signs:**

The clinical reactions recorded in this study were of three degrees of severity; the first was mild that manifested by mild fever ( $39.6^{\circ}\text{C}$  –  $40.5^{\circ}\text{C}$ ), depression, excessive salivation, stiffness in the gait and anorexia. This course lasted 1-2 days. The second degree was the typical form that was manifested by high fever ( $40.6$ - $41.5^{\circ}\text{C}$ ) lasted 3 days, congested mucous membranes, depression, reluctance to move, anorexia, ruminal atony, lymph node enlargement, joint pain, shifting lameness and sternum recumbency similar to that of milk fever. The respiratory rate had been accelerated with nasal and ocular discharges. Sudden and massive drop in milk production was recorded. The third degree was the complicated form that was characterized by long lasting recumbency along the period of observation (22 days) with posterior paresis and/or subcutaneous emphysema at sub-mandibular space, neck and back of animals. It had been generalized all over the body in some animals. In the first outbreak, the clinical reaction was mild in 55 (19.57%), typical in 179 (63.70%) and complicated in 47 (16.73%) of diseased animals while in the second outbreak the clinical reaction was mild in 60 (61.86%) and typical in 37 (38.14%) of the diseased animals whereas the complications

did not appeared. The heavy the weight of the animal, the more severe was the clinical reaction (Figure 1&3).

**Epidemiological data:**

**Disease frequency:**

In outbreak, 2000 out of 590 animals at risk, 281 were diseased; 8 of them were died representing a morbidity rate of 47.62%, mortality rate of 1.35% and a case fatality rate of 2.84%. In comparison, in outbreak, 2004 out of 408 animals at risk, 97 were diseased representing a morbidity rate of 23.77%. Whereas no deaths were recorded (Table 1). It was observed that none of the recovered animals in outbreak, 2000 had been infected in outbreak, 2004 with the exception in only three cases. Moreover the cumulative incidence (CI) over the entire 4 weeks in outbreak, 2000 is 0.476%. So the chance of a randomly chosen animal contracting the disease in that 4 weeks period is 47.6%. On the other hand the cumulative incidence over the entire 5 weeks in outbreak, 2004 is 0.237. So the chance of a randomly chosen animal contracting the disease in that 5 weeks period is 23.7% (Table 2 and Fig. 2). In addition the course of the disease in the first outbreak was 22 days while it was 32 days in the second outbreak

**Temporal distribution:**

Concerning the disease seasonality the two studied outbreaks occurred in Summer months where, outbreak, 2000 was occurred in 17, June and ended in 8, July while outbreak, 2004 was occurred in 21, June and ended In 22, July.

**Sex predisposition:**

In outbreak, 2000, 9 out of 91 (9.89%) male animals and 272 out of 499 (54.50%) female animals were diseased. On the other hand during the outbreak, 2004, 4 out of 63 (6.35%) males and 93 out of 345 (26.96%) females acquired the disease (Table 3).

**Age susceptibility:**

In outbreak, 2000, 6 out of 69 (8.69%) animals till 8 months age, 87 out of 234 (37.17%) animals from eight months to 2 years age and 188 out of 287 (65.5%) animals more than 2 years age were diseased. On the other hand during the outbreak, 2004 none of 45 (0%) animals till 8 months age contracted the disease whereas 42 out of 121 (34.7%) animals from eight months to 2 years age and 55 out of 242 (22.7%) animals more than 2 years age acquired the disease (Table 4).

**Necropsy findings:**

Necropsy finding of the 8 dead animals revealed edema and enlargement of the superficial lymph nodes, presence of serous fluids in

peritoneum, pleura and pericardium. Lungs showed area of congestion and emphysema. Joint contained more fluids. Subcutaneous emphysema was observed in neck, back and extended all over the body.

## DISCUSSION

Bovine ephemeral fever has been prevalent in animals in different parts of the world. The clinical signs observed in both outbreaks (2000 and 2004) were similar to that previously described by St-George (1988); Hassan *et al.* (1991); Nandi and Negi (1999); Nawal *et al.* (2001) and Sayed *et al.* (2001). The variation in the severity of the clinical reaction may be explained as during the period between 2000 and 2004 most animals may be exposed to infection without showing any clinical manifestations. During outbreak, 2004 only unexposed animals showed clinical signs. So monitoring the presence of neutralizing antibodies is very important to expect the disease. If most animals have no antibodies, vaccination is recommended. The variation also may be explained on the basis of different strains of the incriminated virus as well as the age of the animal.

The morbidity rate was lower (23.77%) in outbreak, 2004 than that recorded in outbreak, 2000 (47.62%). This elevation may be attributed to the occurrence of several outbreaks in the farm after 2000 resulting in the presence of many animals immune as a result of these infections. Similar rates were reported previously by Hassan *et al.* (1991) who reported a rate of 32.47%, Sayed *et al.*, 2001 who reported a rate of 45.5% and Soad *et al.* (2001) who reported a rate of 90%. Moreover in outbreak, 2000, the mortality rate was 1.35% and the case fatality rate was 2.84% whereas the recovery rate was 100% in outbreak, 2004. Higher death rate was recorded previously by Sayed *et al.* (2001) who reported a rate of 9.76%. Moreover, the new animals only those who contract the disease in outbreak, 2004 whereas those who contract the disease in outbreak, 2000 were not affected indicating a long immunity after the first attack (Radostits *et al.*, 2000). In addition the longer course of the second outbreak indicating a mild nature of the disease in partially immune animals.

Concerning the disease seasonality, the two studied outbreaks occurred in Summer months. Similar results were reported previously by St-George *et al.* (1993) and Coetzer *et al.* (1994). This may be related to insect activity during these months.

Concerning sex susceptibility in both outbreaks the infection rate was greater in females than males. Similar results were reported

previously by Prasad *et al.* (1997) who reported high susceptibility in females than in males. This may be not absolute and could be attributed to the presence of large number of adult female in comparison to the low number of male animals.

Concerning the age susceptibility the incidence of the disease was lower in young animals than that in adult ones. Moreover the disease also was more severe in heavy weighted adults. Similar findings were previously described by Gibbs (1981); Coetzer *et al.* (1994); Nandi and Negi (1999) and Hamoda *et al.* (2002).

The lesions observed in dead animals were not pathognomonic for the disease however, similar findings were reported previously by Hungerford (1990); Sayed *et al.* (2001) and Hamoda *et al.* (2002).

Finally it can be concluded that the disease was confined to Summer months, developing a long lasting immunity and the clinical reaction varied depending on immune status of the exposed animals as well as their ages. Moreover, the repeated attacks minimize the incidence and the severity of the disease.

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**Table 1:** Morbidity, mortality and case fatality rates in both outbreaks.

Year	Animals At Risk	Diseased animals	Dead animals	Morbidity rate	Mortality rate	Case fatality rate
2000	590	281	8	47.62*	1.35	2.84
2004	408	97	-	23.77*	-	-

\* Significant at  $p < 0.05$

**Table 2:** Cumulative incidence (Attack rate) during both outbreaks.

Week	Outbreak, 2000		Outbreak, 2004	
	No. new cases	CI	No. New cases	CI
1st week	111	0.188	35	0.085
2 <sup>nd</sup> week	114	0.381	41	0.186
3 <sup>rd</sup> week	54	0.472	13	0.218
4 <sup>th</sup> week	2	0.476	6	0.232
5 <sup>th</sup> week	-	-	2	0.237

**Table 3:** Incidence of BEF in the two outbreak in relation to sex.

Sex	Animals At Risk		Diseased animals		Incidence	
	2000	2004	2000	2004	2000	2004
Female	499	345	272	93	54.50*	26.96*
Male	91	63	9	4	9.89*	6.35*
Total	590	408	281	97	47.62	23.77

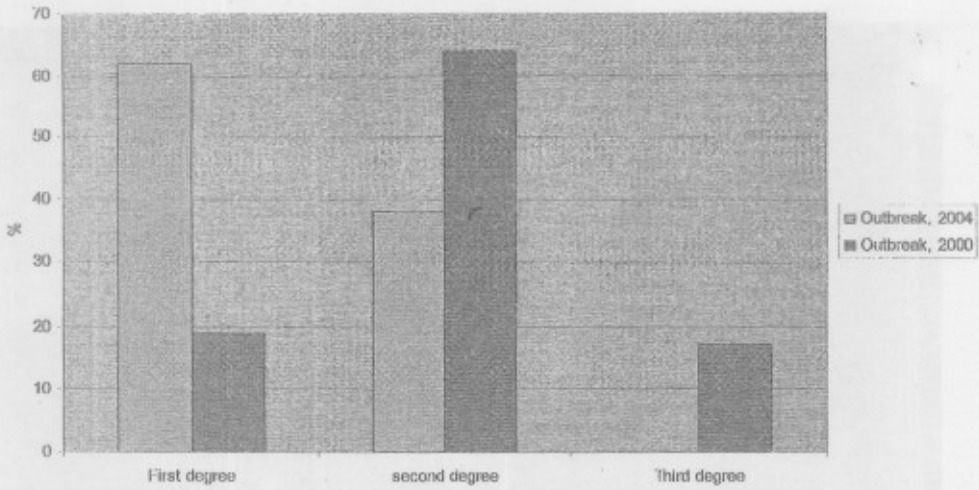
\* Significant at  $p < 0.05$

**Table 4:** Incidence of BEF in both outbreaks in relation to age.

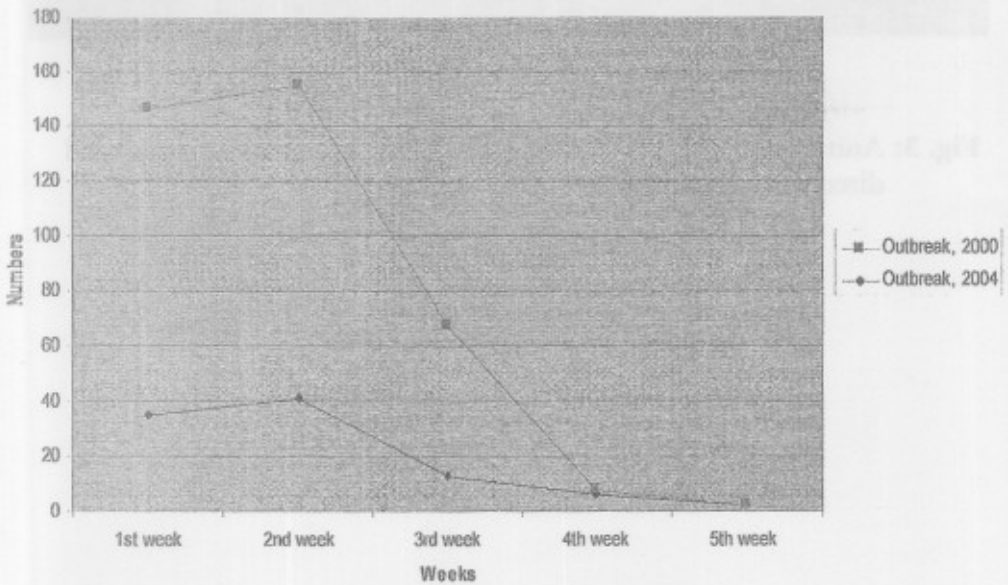
Age	Animals At Risk		Diseased animals		Incidence	
	2000	2004	2000	2004	2000	2004
0→8 months	69	45	6	0	8.69*	0*
>8months→2year	234	121	87	42	37.17*	34.7*
>2year	287	242	188	55	65.5*	22.7*
Total	590	408	281	97	47.62	23.77

\* Significant at  $p < 0.05$





**Fig. 1:** Different degrees of clinical signs in both outbreaks.



**Fig.2:** Cumulative incidence (Attack rate) in both outbreaks



**Fig. 3:** Animal showing depression and sternum recumbency with head directed to flank region