A Sero Surveillance Of Foot And Mouth And Rift Valley Fever Diseases In Shark El-Awinat And EL-Wady El-Gedeed During 2007

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ABSTRACT

This study was planed to follow up the epizootiological situation of FMD & RVF Shark El-awinat and El-Wady El-Gedeed provineces. Seven hundreds serum samples were collected from cattle, sheep and goats . All animals in this area were not vaccinated against FMD &RVF. Serum samples were tested using serum neutralization test (SNT) and Enzyme Linked Immuno-sorbent Assay (ELISA) . Identification of FMD was performed by CHEKIT- FMD-3ABC Kits for detecting non- structural proteins. The SNT results for FMD & RVF revealed that the animals susceptibility were ranged between 98% : 96.6% , 98.7% : 97.4% & 99%- 98% for cattle , sheep and goats respectively. While ELISA results revealed that the animals susceptibility were ranged between 96.6%: 96% , 98 % : 96.6% , 98% for cattle , sheep and goats to FMD & RVF in Shark El-awinat respectively. The susceptibility of all animals to FMD& RVF were 100 % in El-Wady El- Gedeed as detected by ELISA . The probability of natural infection was zero percent in all animals . In conclusion it was considered that El-Wady El-Gedeed is free from FMD & RVF diseases and its recommended to use Their animals in quality control of FMD and RVF vaccinnes.

INTRODUCTION

Foot-and-mouth (FMD) and Rift valley fever (RVF) diseases are the most economically important viral diseases affecting cattle and sheep in Egypt.

Foot-and-mouth disease (FMD) is a highly contagious viral disease of cloven hoofed animals . It is characterized by fever; vesicles in mouth , muzzle, teats, and feet in adults; and sudden death in young animals *(1,2)* .

Foot and mouth disease (FMD) is considered one of the enzootic animal diseases in Egypt *(3-5)*. The importation of infected animals could account for the appearance of new antigenic different FMD serotype in Egypt *(6)*. These strains circulate among animals ranging at different prevalence and some reach to commercial dairy farms causing serious outbreaks.

Since 1960 up to January 2006 FMDV serotype O_1 is the predominant type in Egypt . An outbreak of FMDV type A started in bulls imported from Ethiopia *(7)*. These strains circulate among animals leading to high economic loss.

RVF is an acute febrile infectious arthropod born zoonotic disease caused by arbovirus virus of the genus phlebovirus , family bunyviridae causing high rate of abortion and neonatal mortality in sheep , goats and cattle *(8,9)*.

In 1977 RVF outbreak occurred in Egypt involving a large number of severe human cases *(10)*. Out break of RVF was reported among both human and animals in Aswan Governorates *(11)* as well as cases of RVF were reported in Kafer EL-Sheikh governorate in September 2003 *(12)*.

RVF disease is widely distributed in Africa and Asia causing high mortalities among lambs and calves and heavy abortion among pregnant ewes, cattle and buffaloes *(13,14)*.

RVF disease has been reported as periodic epizootic with 5 to 15 years cycle, the recent outbreaks of RVF in Kenya 2006-2007 has led to live stock loss and human mortality *(15)*.

The present study was planned to determine the immune status of different animal species to FMD & RVF diseases in area of Shark El-Awinat and EL-Wady EL-Gedeed during 2007.

MATERIAL AND METHODS

Serum samples

A total of seven hundreds Serum samples from healthy cattle, sheep and goats (four hundreds from Shark El-awinat district and Three hundreds from El- Wady El-Gedeed district) were collected. They were screened against FMD types O_1/3/93 & A/Egypt/1/2006 and Rift valley fever using SNT and ELISA .

FMD virus

Local strains of FMD virus type O_1/3/1993 & A/Egypt/1/2006 were used in the purposes of SNT & ELISA were supplied by FMD department ,Vet. Ser. Res. Inst. Abbasia, Cairo.

RVF virus

RVF virus was isolated from human patient in Zagazig ,Sharkia province and RVF antigen for ELISA were supplied by RVF department, Vet. Ser. Res. Inst. Abbasia, Cairo.

Serum neutralization test (SNT)

The micro- technique of neutralization test for FMD *(16)* and Rift valley fever *(17)* was carried out.

Indirect Enzyme linked Immuno sorbent assay (ELISA)

FMDV antibodies against type O_1 & A/Egypt *(18, 19)* and for RVF were *(20)* were determined using ELISA Technique.

CHEKIT-FMD-3ABC- ELISA

This test was used to detect the present or past infection with FMD . CHEKIT-FMD-3ABC-ELISA was provided by Bommeli Diagnostics Liebefeold –Bern, Switzerland . The test was done according to manifacture instructions.

RESULTS

Table 1. Protectivity and susceptibility percent for animals in Shark El-Awinat and EL-Wady El-Gedeed using Serum neutralizing test

Governorate	Animal species	NO. of serum sample	Protectivity				susceptibility			
			FMD		RVF		FMD		RVF	
			Positive				Negative			
			No.	%	No.	%	No.	%	No.	%
Shark El-awinat	Cattle	150	3	2%	5	3.4%	147	98%	145	96.6%
	Sheep	150	2	1.3%	4	2.6%	148	98.7%	146	97.4%
	goat	100	1	1%	2	2%	99	99%	98	98%
EL-WADY EL-GEDEED	Cattle	200	0	0%	0	0%	200	100%	0	100%
	Sheep	100	0	0%	0	0%	100	100%	0	100%

Table 2. Protectivety and susceptibility percent for animals in Shark El-Awinat and EL-Wady El-Gedeed using ELISA

Governorate	Animal species	NO. of serum sample	Protectivety				susceptibility			
			FMD		RVF		FMD		RVF	
			Positive				Negative			
			No.	%	No.	%	No.	%	No.	%
Shark El-awinat	Cattle	150	5	3.4%	6	4%	145	96.6%	144	96%
	Sheep	150	3	2%	5	3.4%	147	98%	145	96.6%
	goat	100	2	2%	2	2%	98	98%	98	98%
EL-WADY EL-GEDEED	Cattle	200	0	0%	0	0%	200	100%	0	100%
	Sheep	100	0	0%	0	0%	100	100%	0	100%

Table 3. Detection of FMD antibody in animal sera in Shark El-Awinat and in in EL-Wady EL-Gedeed using commercial ElISA Kit for non- structural proteins 3ABC

Governorate	Animal species	Total number	Antibodies to non-structural protein (3ABC)			
			Negative 3ABC		Positive 3ABC	
			No.	%	No.	%
Shark El-Awinat	cattle	150	150	100 %	0	0 %
	sheep	150	150	100 %	0	0 %
	Goat	100	100	100 %	0	0 %
EL-Wady EL-Gedeed	cattle	200	200	100 %	0	0 %
	sheep	100	100	100 %	0	0 %

DISCUSSION

It was Know that the animals in Shark El-awinat and El-Wady El-Gedeed were not vaccinated against foot and mouth (FMD) and Rift valley fever (RVF) diseases. FMD was suspected to have been transmitted to species which infection is frequently sub-clinical such as sheep. Serological surveillance might be required in order to identify animals which have been exposed to the virus and developed antibodies *(21)* . Therefore , the rapid and accurate diagnosis of FMDV outbreak was critical for the control of the disease. In the present study, serum neutralization test (SNT) and ELISA were used to determine the antibody status of livestock whether they susceptible to FMD and RVF diseases or not. The results showed that the susceptibility percentage in Shark El-Awinat for FMD were 98% , 98.7% & 99% for cattle ,sheep and goats respectively by SNT , while the percentages of susceptibility against RVF were 96.6%, 97.4 %& 98% for cattle, sheep and goats respectively as shown in Table 1 . Sera from negative non vaccinated, non infected cattle generally had negative antibody titer to structural & non structural Proteins of FMDV*(22)*.

The susceptibility percentage were 96.6% , 98% & 98% in Shark El-Awinat aginst FMD cattle , sheep and goats respectively while against RVF were 96% , 96.6% & 98% for cattle, sheep and goats respectively when examined by ELISA , as shown in Table (2) . These results revealed that there was correlation between ELISA & SNT results as cited by *(18)* .

In 2003 70 sheep serum samples were examined from EL-Wady El-Gedeed using ELISA and SNT which showed that 97.4 % and 100% were negative to RVF respectively *(23)*. It has been proved that ELISA and SNT gave similar results *(24)*.

The percentages of susceptibility in EL-Wady EL-Gedeed against FMD & RVF were 100% in cattle and sheep using SNT& ELISA.

Regarding the detection of antibodies to non-structural protein (3ABC) using a commercial kit, The tested serum samples revealed that the percentages of infection were zero % in cattle , sheep and goats as shown in Table 3 . These results are similar to those obtained by several studies *(25, 26)* which recorded that non-infected animals with FMD don't produce antibodies against non-structural proteins. The little low level of antibodies either to FMD or RVF which recorded may be attributed to transmission of some vaccinated animals from neighbor virus areas.

From these results, it could be concluded that Shark El-Awinat and EL-Wady EL-Gedeed provinces are free from Foot and mouth disease and Rift valley fever disease.

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الملخص العربى

مسح سيرولوجى لمرضى الحمى القلاعية وحمى الوادى المتصدع فى منطقتى شرق العوينات والوادى الجديد

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تم عمل مسح سيرولوجى لمرضى الحمى القلاعية وحمى الوادى المتصدع فى الأبقار والأغنام والماعز فى منطقتى شرق العوينات والوادى الجديد. وكانت النتيجة سلبية باستخدام اختبار المصل المتعادل بالنسب التالية: (٩٨% -٩٦,٦ %) & (٩٨,٧% -٩٧,٤%) & (٩٩ % -٩٨ %) للابقار والأغنام و الماعزلكل من الحمى القلاعية وحمى الوادى المتصدع على التوالى .وكانت النتيجة باستخدام اختبار الاليزاسلبية بالنسب التالية (٩٦,٦% -٩٦ %) & (٩٨ % - ٩٦,٦ %) &(٩٨%) للابقار والأغنام و الماعزلكل من الحمى القلاعية وحمى الوادى المتصدع على التوالى فى منطقة شرق العوينات . كما ثبت خلو جميع العينات التى تم فحصها من أى عدوى بمرض الحمى القلاعية وذلك عند اختبارها بالبروتين الغيربنائى CHEKIT-FMD-3ABC- ELISA

وكانت النتيجة سلبية بنسبة١٠٠% ولم يثبت وجود أى أجسام مناعية للحمى القلاعية وحمى الوادى المتصدع فى الأبقار والأغنام باستخدام اختبارى المصل المتعادل والاليزا فى منطقة الوادى الجديد .وعلى ذلك تكون نسبة قابلية الحيوانات التى تم فحصها للعدوى ١٠٠% . وبهذه النتيجة تعتبر محافظة الوادى الجديد خالية من مرضى الحمى القلاعية وحمى الوادى المتصدع بنسبة١٠٠% ونوصى باستخدام حيوانات هذه المنطقة فى إجراء اختبارات تقييم اللقاحات.