

Animal Health Research Institute  
Assiut Regional Laboratory

**SEROLOGICAL STUDIES ON BRUCELLA  
INFECTION IN CATTLE, SHEEP AND GOATS IN  
ASSIUT GOVERNORATE**  
(With 4 Tables and 4 Figures)

By

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دراسات سيرولوجية عن البروسيلا في الابقار، الاغنام، الماعز  
في محافظة أسيوط

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لقد أجريت دراسة سيرولوجية على ٦٤٩٥ من الابقار و ٨٤٥٧ من الاغنام و ٣٨٧٢ من الماعز في خمس مناطق مختلفة في محافظة أسيوط ( ديروط - القوصية - منفلوط - صدفا - مركز أسيوط ) بقصد التعرف على نسبة الإصابة بالبروسيلا في الابقار - الاغنام - الماعز في هذه المناطق وذلك في الفترة من نوفمبر ١٩٩٧ الى ديسمبر ١٩٩٨ وقد تم فحص هذه العينات سيرولوجيا بواسطة اختبارات الروزبنجال والمحمض المتوازن الشريحي واختبار التلبد الانبوبي واختبار الريفانول , وقد أوضحت الدراسة أن نسبة الإصابة في المناطق المختلفة هي ٠,٩٦ % , ٠,٤٨ % , ٠,٣٦ % , ٠,٥٤ % , ٠,٤٧ % في الابقار و ١,١ % , ١,٨ % , ١,٠٤ % , ٠,٨ % , صفر % في الاغنام و ٠,٩ % , ١,٧ % , ٠,٠٨ % , ٠,٧٥ % , صفر % في الماعز على الترتيب , وكانت نسبة الإصابة في المحافظة بواسطة الاختبارات الاربعة ( الروزبنجال - المحمض المتوازن الشريحي - التلبد الانبوبي - الريفانول ) كالتالي ( ٠,٦١ % , ٠,٦١ % , ٠,٤٦ % , ٠,٥٨ % في الابقار ) , ١,١٥ % , ١,١٥ % , ٠,٨٥ % , ١,١ % في الاغنام , ١,١ % , ١,١ % , ٠,٧٤ % , ١ % في الماعز , ولقد وجد أن كل من اختبار الروزبنجال والمحمض الشريحي المتوازن أكثر كفاءة في اجراء عمليات المسح السيرولوجي واكتشاف الاجسام المضادة في الحيوانات المصابة بالبروسيلا ومن ناحية اخرى وجد أن اختبار التلبد الانبوبي يفتقر الى الحساسية والدقة بينما الريفانول أكثر دقة وحساسية بمقارنته بالاختبارات الاخرى.

## SUMMARY

A serological study was carried out on 6495, 8457 and 3872 sera of cattle, sheep and goats in five different localities in Assiut Governorate (Dirout, El-Kossia, Manflout, Sedfa and Assiut center) to estimate the incidence of brucella infection among some ruminant animals (cattle, sheep and goats) in Assiut Governorate through the period from November 1997 to December 1998. All samples were serologically examined by Rose Bengal plate test (RBPT), Buffer Acidified Plate test (BAPAT) and positive sera were confirmed by tube agglutination test (TAT) and Rivanol test. The obtained results indicate that the incidence of brucellosis among cattle, sheep and goats, in five different localities (Dirout, Manflout, El-kossia, Sedfa and Assiut) of Assiut Governorate in cattle, sheep and goats were (0.96 %, 0.48%, 0.36, 0.54 %, 0.47%), (1.1%, 1.8%, 1.04%, 0.8%, 0.0%), and (0.9%, 1.7%, 0.8%, 0.75%, 0.0%) respectively. The brucella seroprevalence proportion among cattle, sheep and goats in Assiut Governorate by different 4 serological tests (RBPT, BAPAT, TAT and Rivanol) were (0.61%, 0.61%, 0.46%, 0.58%), (1.15%, 1.15%, 0.85%, 1.1%) and (1.1%, 1.1%, 0.74%, 1%) respectively. Also it was found that RBAPT, BAPAT more efficient and highly sensitive in screening work and detection of brucella infection, on other hand TAT is a poor sensitive and specific, while Rivanol test is more specific and sensitive in comparison to other tests RBAPT, BAPAT and TAT).

*Key words: Serological studies on Brucella.*

## INTRODUCTION

In Egypt brucellosis is still remaining one of the most important serious recognized disease problems, so intensive governmental efforts were done to minimize widespread of brucella infection among our livestock to an acceptable level. Some investigations were carried in Assiut Governorate to determine the prevalence and incidence percentage of brucella infection among cattle, sheep and goats. Nashed (1977) found that 0.8% of cattle were positive seroreactors. Zaghloul and Kamel (1985) recovered that the incidence percentage of brucella infection

among cattle was 2.7% while Mohamed (1986) found that 8.6% of cattle were positive for brucella infection. In Egypt Zaki (1943) mentioned that the spread of brucella infection among sheep was recorded as incidence of ovine brucellosis and added that this incidence was 9.57% by using tube agglutination test (TAT).

Alton (1963) found that out of 559 samples of sheep, 3.5% were positive reactors in tube agglutination, while El-Olemy (1974) recorded a higher infection rate of brucellosis among sheep 4.62 % by Rose Bengal test and 3.79% by TAT. El-Gibaly *et al.* (1977) recorded that 2% brucella positive reactors to TAT while Nashed (1977) recorded all over infection among sheep in Assiut Governorate, 0.74 % in Rose Bengal test and 0.25 % by TAT.

Nashed (1977) reported that the incidence of caprine brucellosis was 0.88%, While Nada (1982) found that 4.7% among goats, on other hand Zaghoul and Kamel (1985) failed to detect any positive reactors among goats in Assiut Governorate. The incidence of brucella among the different species of animals differs from one locality to another, for this reason and for economic significance of the disease in different animal species, this investigation was carried out to study the:

- Prevalence of the disease among some different species of animals (cattle, sheep and goats).
- Incidence of the disease in different localities of Assiut Governorate (Dirout, El-Kossia, Manflout, Sedfa and Assiut).
- Evaluation of some serological tests (Rose Bengal test, Buffered acidified plate test, Tube agglutination test and Rivanol test).

## **MATERIAL and METHODS**

A total of 16824 blood samples were aseptically collected from cattle (6595), sheep (8457) and goats (3872) at Assiut Governorate (Tables 1,2 and 3) during November 1997 to December 1998 through national brucellosis eradication programme.

The collected samples were kept in the refrigerator over night. The sera obtained were carefully decanted and transferred into 2 ml sterile tubes.

All the sera were subjected to four serological tests, Rose Bengal plate test (RBPT) and Buffered Acidified plate test (BAPAT). Sera which

gave positive reactions were furtherly subjected to the tube agglutination test (TAT) and Rivanol test.

The used antigens were supplied by Serum and Vaccine Research Institute, Abbasia, Cairo. The method for RBPT and BAPAT and TAT were performed according to manual of bovine brucellosis (Anon, 1992). While rivanol test was carried out according to (Anon, 1984).

## RESULTS

The obtained results were tabulated in tables 1-4 and figures 1-4

## DISCUSSION

Brucellosis is still one of the serious problem due to its zoonotic and economic importance. The control of the disease depends mainly upon the use of efficient procedures which depends on the quality of these serological tests in particular, sensitivity and specificity, Tizard (1982).

From the obtained results in Table (1) the serological prevalence of brucellosis among 6495 tested cattle by 4 different serological tests (RBPT, BAPAT, TAT and Rivanol test) in 5 different localities in Assiut Governorate (Dirout, El-Kossia, Manflout, Sedfa and Assiut centers) were ( 0.96 %, 0.48%, 0.36%, 0.54% and 0.47%) respectively. The incidence of brucella infection among cattle by 4 different serologic tests in Assiut Governorate were (0.61%, 0.61%, 0.46% and 0.58 %) respectively, which is much lower than that recorded by Kamel and Abdel-Fattah (1963), Abdulla (1966), Abdel-Aal (1985), Zaghoul and Kamel (1985) and El-Sherry (1987) 23%, 1.7% , 15.6 %, 2.7% and 13.4 % respectively. However it is slight less than those recorded by Nashed (1977) and Kaldes (1990) which were 0.8 % and 0.97 % respectively. This lower incidence of brucellosis among 6495 examined cattle in this study may be attributed to vaccination of farm animals, periodical examination of the animals and dry hot weather in Assiut Governorate limit the spreading of infection from area to another where brucella organisms do not survive in the dry hot climate for long periods. On the other hand it is higher than that recorded by Hamada (1963) who failed to detect any positive cases may be attributed to that the samples were small in number and taken from restricted free area.

Recently Abdel-Hafeez (1996) reported the incidence of brucellosis among cattle in 4 different localities in Assiut Governorate (Assiut, Manflout, Sedfa and El-Ghaniem) by using the same serological tests (RBP, BAPA, TAT and Rivanol test) were (1.12, 0.3%, 0.31%, 0.29%) which nearly similar to our results. And that may be attributed to some extent to the similarity in localities area and conditions of the study.

The recorded results in Table (2) showed that the incidence of brucella infection among sheep in 5 different localities in Assiut Governorate (Dirout, El-Kossia, Manflout, Sedfa and Assiut) by 4 serodiagnostic tests were (1.1%, 1.8%, 1.04%, 0.8% and 0.0%) respectively. The incidence of brucellosis among sheep in Assiut Governorate was 1.15 %, 1.15%, 0.85% and 1.1 % which is lower than that mentioned by Abdulla (1966), El-Olemy (1974), El-Gibaly *et al.* (1977), Salem (1981), Nada (1982) and El-Bauomy (1989) whose reported an incidence of brucellosis by different serological tests among sheep were 1.7%, 4.92%, 2 %, 5.6%, 2.31% and 15.03 % - 19.99 % respectively, and higher than that recorded by Nashed (1977) who found that incidence of brucellosis was 0.74%, while Zaghoul and Kamel (1985) failed to detect any positive cases among sheep in Assiut Governorate. The lowered incidence of brucellosis among sheep in the present study may be attributed to most of samples collected from 5 localities representing Assiut governorate and including herds without case history of abortion or brucella infection also the deserty dry hot weather of Assiut Governorate limit the spreading of brucella microorganisms where the microorganisms cannot survive for long period and consequently limit the spread of infection. Nashed (1977) and Gadalla (1991). On the other hand the higher incidence than that obtained in the present study by several authors may be attributed to that most of samples were collected from infected herds which have a history of abortion.

Recently Ali (1997) recorded nearly similar results in serological survey on brucellosis among sheep in six different localities in Assiut Governorate by the same tests which were (1.3%, 2.2%, 0.83, 1.99%, 0.88% and 0.88%) respectively.

The recorded results in Table (3) illustrate that percentage of brucella infection among goats in 5 different localities were 0.9%, 1.7%, 0.8%, 0.75% and 0.0% respectively and an incidence of brucella infection among goats in Assiut Governorate is (1.1%, 1.1%, 0.74% and 1.0%)

respectively, several authors as El-Nahas (1951), Kamel *et al.* (1961), Shaukat (1973), Nada (1982) and El-Olemy *et al.* (1984) mentioned that the rate of brucella infection among goats was 21.5%, 5.8%, 7.1%, 4.7% and 5.2% respectively, which was more higher than that recorded in the present study, may be due to most of the collected samples were collected from infected flocks having a history of abortion. On the other hand Nashed (1977) recorded a similar incidence (0.82 %) among goats in Assiut Governorate while Zaghloul and Kamel (1987) failed to detect any positive reactors among goats in Assiut province and that may be attributed to that most of samples were collected from restricted newly free non infected areas.

Recently Abdel-Kader (1996) obtained a lower incidence of caprine brucellosis in 4 different localities in Assiut governorate by 4 different serological tests (0.49 %, 0.34%, 0.67% and 0.06%) respectively which may be attributed to the fact that most of their samples were collected from flocks may be without history of brucellosis and in the same time it included large numbers of animals and lasted for long time.

The lower seroprevalance of caprine and ovine brucellosis in Assiut locality (0.0%) in this study may be attributed to the dry desert weather which limits spreading of infection and lack of the big herds which aids in spreading of brucella infection. So the obtained results could be regarded more or less real and perfect representing the actual status of ovine brucellosis in Assiut Governorate.

From Table (4) and Fig. (4) the total seroprevalance of brucella infection among cattle, sheep and goats in Assiut Governorate were 0.58%, 1.1% and 1% respectively, this result proved that the incidence of brucella infection among cattle is more less 0.58% in comparing with brucellosis in sheep and goats (1.1% and 1%), this may be attributed to that the infection among cattle was overcome by vaccination, hygienic measures, periodical examination of animals and control measures were taken in transportation of animals from place to another which limit the spreading of infection among cattle. Also the incidence of brucella infection among sheep and goats in Assiut Governorate is nearly equal to each other and that may be due to that they are grazing with each other and then facilitate the spread of infection between the flocks.

From the obtained results in Table (1) cattle, (2) sheep, and (3) goats, it cleared that RBPT and BAPAT could be regarded as screening tests for detection of positive brucellosis as they showed the higher

percentage of positive reactors in cattle 0.61 % , 0.61 % in sheep 1.15 % , 1.15 % and 1.1 % , 1.0 % in goats respectively if compared with TAT , Rivanol tests in cattle 0.45 % , 0.58 % , in sheep 0.85 % , 1.1 % and in goats 0.74 % and 1% respectively . This indicates the higher sensitivity of these tests (BAPAT&RBPT) as reported by Davis (1971) and El-Bauomy (1989). Moreover, the acidic pH (3.65 in RBPT and 4.0 in BAPAT) of the antigen used in these tests inhibit to a certain extent the activity of non-specific immunoglobulins. On the other hand TAT suffers to a certain extent from these specifications. Davis (1971), it is some what slow in detecting recently infected animals and may miss some cases of chronic infection while RBPT is more efficient in the detecting of early and chronic infection, Montaser (1995).

The results of Rivanol test, to some extent, are nearly similar to that obtained by RBPT and BAPAT and this may be due to that most of the positive reactors were in chronic stage of the disease in which the IgG antibodies were evident, where as the rivanol test is specific for detection of IgG antibodies.

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Table (1) : Incidence of brucella infection among cattle in 5 different localities in Assiut Governorate by using 4 serological tests .

Locality	Total Examined Animals	Serological tests																					
		RBPT					BAPAT					TAT					Rivanol						
		+	-	%	+	-	%	1/40	1/80	1/160	1/320	+	-	%	1/25	1/50	1/100	1/200	1/400	+	-	%	
Dirout	1562	16	1548	1	16	1548	1	2	10	1	-	13	2	1547	0.83	3	-	3	8	1	15	1547	0.96
El-Kossia	2493	12	2481	0.48	12	2481	0.48	4	3	2	-	9	2	2482	0.36	1	3	2	4	2	12	2481	0.48
Manflout	837	3	834	0.36	3	834	0.36	2	-	-	-	2	1	834	0.24	-	2	1	-	-	3	834	0.36
Sedfa	551	3	548	0.54	3	548	0.54	1	1	-	-	2	1	548	0.36	1	-	-	2	3	548	0.54	
Assiut	1052	6	1046	0.57	6	1046	0.57	2	2	-	-	4	1	1047	0.38	1	1	3	-	5	1047	0.47	
Total	6495	40	6482	0.61	40	6482	0.61	11	16	3	-	30	7	6515	0.46	6	6	9	12	5	38	6455	0.58

Table (2) : Incidence of brucella infection among sheep in 5 different localities in Assiut Governorate by using 4 serological tests .

Locality	Total Examined Animals	Serological tests																					
		RBPT					BAPAT					TAT					Rivanol						
		+	-	%	+	-	%	1/40	1/80	1/160	1/320	+	-	%	1/25	1/50	1/100	1/200	1/400	+	-	%	
Dirout	3431	42	3389	1.2	42	3389	1.2	12	15	3	-	30	10	3391	0.88	6	4	11	6	13	40	3391	1.1
El-Kossia	1181	23	1158	1.9	23	1158	1.9	4	7	6	-	17	3	1161	1.4	5	2	2	3	10	22	1151	1.8
Manflout	2009	21	1988	1.04	21	1988	1.04	6	7	3	-	16	3	1990	0.8	3	2	5	4	7	21	1988	1.04
Sedfa	1245	12	1233	0.9	12	1233	0.9	3	4	2	-	9	2	1234	0.7	1	3	4	2	-	10	1235	0.8
Assiut	591	-	591	-	-	591	-	-	-	-	-	-	-	591	0.0	-	-	-	-	-	-	591	0.0
Total	8457	98	8359	1.15	98	8359	1.15	25	34	14	-	72	18	8367	0.85	15	11	22	15	30	93	8364	1.1

Table (3) Incidence of brucella infection among goats in five different localities in Assiut Governorate by using 4 serological tests

Locality	Total Examined Animals	Serological tests																							
		RBPT					BAPAT					TAT					Rivanol								
		Titer				Total				Titer				Total				Titer				Total			
		+	-	%	+	-	%	1/40	1/80	1/160	1/320	+	-	%	1/25	1/50	1/100	1/200	1/400	+	-	%			
Dirout	759	7	752	0.9	7	752	0.9	2	2	1	-	5	1	753	0.6	2	1	3	1	-	7	752	0.9		
El-Kossia	1221	25	1196	2	25	1196	2	4	8	3	1	16	4	1201	1.3	3	6	2	2	8	21	1200	1.7		
Manflout	592	6	586	1.01	6	586	1.01	1	2	1	-	4	2	586	0.7	1	1	3	-	5	587	0.8			
Sedfa	792	7	785	0.88	7	785	0.88	2	2	-	-	4	3	785	0.5	4	2	-	-	6	786	0.75			
Assiut	508	-	508	-	-	508	-	-	-	-	-	-	-	508	-	-	-	-	-	-	-	508	0.0		
Total	3872	45	3827	1.1	45	3827	1.1	9	14	5	1	29	10	3833	0.74	10	10	8	3	8	39	3833	1		

Table (4): Final Results of % incidence of brucella infection among cattle, sheep and goats in Assiut Governorate.

Locality	Cattle	Sheep	Goats
Dirout	0.96	1.1	0.9
El-Kossia	0.48	1.8	1.7
Manflout	0.36	1.04	0.8
Sedfa	0.54	0.8	0.75
Assiut	0.47	0.0	0.0
Total	0.58	1.1	1

Fig. (2) : % of incidence of brucellosis in different localities among sheep by different serological tests

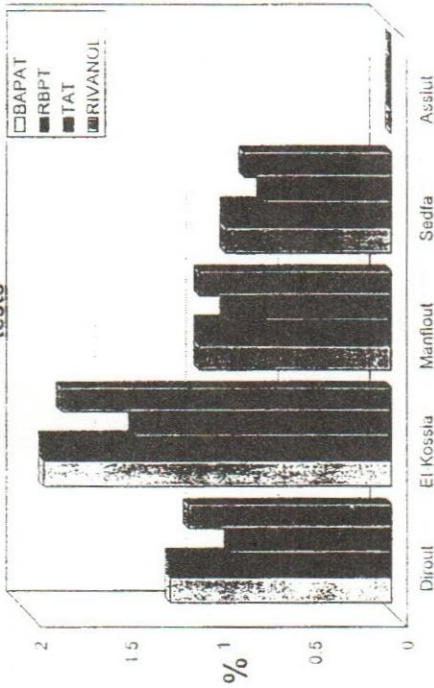


Fig. (4): Final incidence % of brucella infection among Cattle, Sheep and Goats In Assiut Governorate

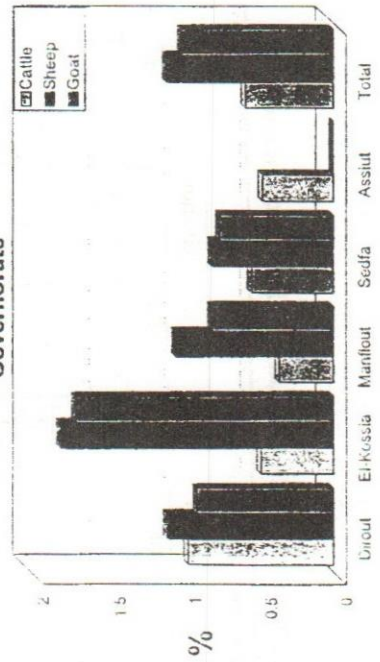


Fig. (1) : % of incidence of brucellosis in different localities among cattle by different serological tests

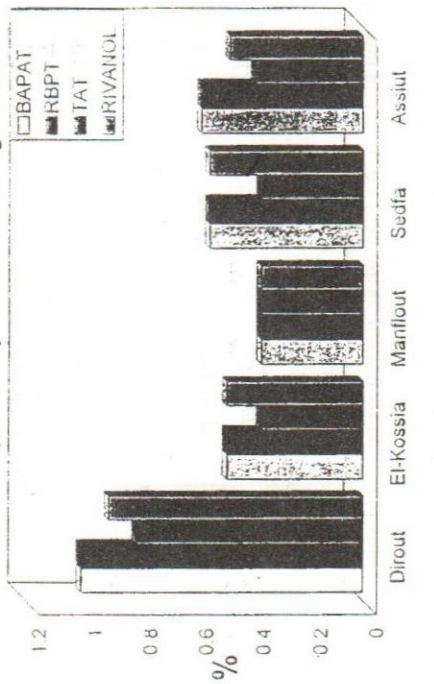


Fig. (3) : % of incidence of brucellosis in different localities among goat by different serological tests

