SEROEPIDEMIOLOGICAL PATTERN OF BRUCELLSIS AMONG BUFFALOES IN NORTHGUJARAT

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ABSTRACT

Sero surveillance of brucellosis was carried out in buffaloes belonging to different organized farms and villages of North Gujarat during 2003-2005. Total 1088 heads of buffaloes were screened for brucella antibodies by Rose Bengal Plate Agglutination Test (RBPT), Standard Tube Agglutination Test (STAT) and indirect Enzyme Linked Immuno Sorbant Assay (i ELISA). Overall sero prevalence was 10.66, 10.29 and 9.38 by RBPT, STAT and i ELISA among buffaloes. Higher prevalence was observed in field cases. Irrespective of breed, older animals (> 12 years of age) had significantly higher infection rate (25.00 %) than younger animals (1.38 %). Sero prevalence rate showed upward trend with successive lactations. Higher sero prevalence rate was observed among female animals. Pregnant heifers showed significantly higher sero prevalence as compared to unconceived heifers. Overall sero prevalence with the history of abortion, retained placenta, repeat breeder, abortion and ROP, abortion and RB, ROP and RP or all the three were 20.51,22.22, 8.82,11.76, 20.00,17.65 and 38.09 per cent, respectively. Seropositivity in the buffaloes of organized farms was 3.45 and 14.29 per cent in apparently healthy buffaloes and buffaloes with reproductive problems.

KEYWORDS : Sero prevalence, Brucellosis, Buffalo, RBPT, STAT, i ELISA.

INTRODUCTION

Sero prevalence of brucellosis in buffaloes has been reported from parts of the country (Shaw, 1986). In central Gujarat, 10 to 18 per cent of brucellosis was reported in buffaloes (Varasada, 2003). Most studies on brucellosis confine to the seroprevalence. This paper emphasizes seroepidemiological pattern of brucellosis in different categories of buffaloes in north Gujarat.

MATERIALS AND METHODS

A total of 1088 heads of buffalo belonging to different categories-organized farms and villages of Gujarat were examined during 2003-2005. Epidemiological parameters like age, sex, number of lactation, managemental practice and gynecological problems were studied. Serum samples from Mehsana buffaloes (141), Jafrabadi buffaloes(102) and buffaloes from different villages of north Gujarat(845) were screened for brucella antibodies by Rose Bengal Plate Test (RBPT), Standard Tube Agglutination Test(STAT) and indirect Enzyme Linked Immuno Sorbant Assay(iELISA). Brucella antigen was obtained from the Division of Biological Products, IVRI, Izatnagar. Indirect ELISA was performed using the kit manufactured by VMRD, Inc. Pull man, USA.

RESULTS AND DISCUSSION

Overall sero prevalence rate were 10.66, 10.29 and 9.38 per cent by RBPT, STAT and indirect ELISA, respectively among buffaloes. In field cases, it was higher i. e. 11.83, 11.48 and 10.53 per cent (Table 1). Rate of prevalence by RBPT closely agree with the findings of Lodhi *et. al.*(1955).

Table 1 Sero prevalence of brucellosis among buffaloes.

	No. of samples tested	No. of animals found positive by		
		RBPT	STAT	I ELISA
Organized farm buffaloes				
Mehsana LRS	141	10 (7.09)	10 (7.09)	8 (5.67)
Jafrabadi CBF	102	6 (5.88)	5 (4.90)	5(4.90)
Total	243	16(6.58)	15(6.17)	13(5.35)
Field buffaloes				
Banaskantha	222	22(9.91)	25(11.26)	17(7.66)
Mehsana	234	31(13.25)	31(13.25)	28(11.97)
Patan	179	24(13.41)	22(12.29)	22(12.29)
Sabarkantha	210	23(10.95)	19(9.05)	22(10.48)
Total	845	100(11.83)	97(11.48)	89(10.53)
Overall	1088	116(10.66)	112(10.29)	102(9.38)

Table 2 Age wise Sero prevalence of Brucella abortus buffaloes by i ELISA.

Age group	FIELD		FARM		OVERALL	
(Years)	Tested	Positive	Tested	Positive	Tested	Positive
< 2	88	2 (2.27)	57	0 (0.00)	145	2 (1.38)
2-4	113	7(6.19)	55	1(1.82)	168	8(4.76)
4-6	165	13(7.88)	39	2(5.13)	204	15(7.35)
6-8	146	16(10.96)	54	5(9.26)	200	21(10.50)
8-10	151	17(11.26)	19	2(10.53)	170	19(11.18)
10-12	107	15(14.02)	14	2(14.29)	121	17(14.05)
> 12	75	19(25.33)	5	1(20.00)	80	20(25.00)

Table 3 Lactation wise Sero prevalence of Brucella abortus buffaloes by i ELISA.

Lactation no.	FIELD		FARM		OVERALL	
(Years)	Tested	Positive	Tested	Positive	Tested	Positive
1-2	194	15 (7.73)	52	4 (7.69)	246	19 (7.72)
3-4	198	21(10.61)	38	5(13.16)	236	26(11.02)
5-6	192	13(13.54)	26	2(7.69)	218	28(12.84)
7-8	46	8(17.39)	9	1(11.11)	55	9(16.36)
>8	13	4(30.77)	3	1(33.33)	16	5(31.25)

Seroprevalence by STAT in the present study was similar to that reported by Chauhan *et. al.*(2000). In buffaloes from organized farms, comparatively lower seroprevalence rate were observed i. e. 6.58, 6.17 5.36 by RBPT, STAT and ELISA, respectively. This may be due to efficient culling practice. In field cases, higher seroprevalence in Patan and Mehsana districts could be attributed to intensive farm practice compared to Banaskantha district.

Table 4 Sex wise Sero prevalence of Brucella antibodies by RBPA, STAT and i ELISA.

	Sex	No. of samples tested	No. of animals found positive by		
			RBPT	STAT	i ELISA
Field	M	78	7 (8.97)	9 (11.54)	9 (11.54)
Cases	F	767	93 (12.13)	88 (11.47)	80 (10.43)
Farm	M	27	1 (3.70)	1 (3.70)	1 (3.70)
cases	F	216	15 (6.94)	14 (6.48)	12 (5.56)
Overall	M	105	8 (7.62)	10 (9.52)	10 (9.52)
	F	983	108 (10.99)	102 (10.38)	92 (9.36)

Table 5 Sero prevalence as per productive and reproductive status by i ELISA.

Status of animal	FIELD		FARM		OVERALL	
	Tested	Positive	Tested	Positive	Tested	Positive
Heifer	108	5 (4.63)	81	0 (0.00)	189	5 (2.65)
Preg. Heifer	16	1(6.25)	4	0 (0.00)	20	1 (5.00)
Dry non pregnant	174	30 (17.24)	17	2 (11.67)	191	32 (16.75)
Dry pregnant	95	20 (21.05)	16	2 (12.50)	111	22 (19.82)
Lactating non pregnant	192	11 (5.73)	67	5 (7.46)	259	16 (6.18)
Lactating pregnant	182	15 (8.24)	31	3 (9.68)	213	18 (8.45)
Breeding	24	6 (25.00)	8	0 (00.00)	32	6 (18.75)
Growing	54	3(5.56)	19	1 (5.26)	73	4 (5.48)

Table 6 Herd size wise seroprevalence of Brucella abortus antibodies by ELISA in field.

Size of herd	Buffalo	
	Sample Tested	Sample positive
1 to 5	194	11(5.67)
6 to 10	386	43(11.14)
11 to 15	163	21(12.88)
>16	102	14(13.73)

Figures in the parenthesis indicate prevalence rates.

Overall seroprevalence rate in buffaloes below 2 years of age was 1.38 per cent. Seroprevalence rate was maximum in buffaloes above 12 years of age showing an upward trend and tend to support the observations made by Sharma *et. al.* (2003) because the animals were not yet exposed to natural infection or vaccine. Lactation wise seroprevalence of brucella antibodies based on 1-2, 3-4,5-6,7-8 and above 8 lactations indicated overall rates ranging from7.72 to 31.25 per cent. Seroprevalence rate showed upward trend with successive lactations and pointed out their carrier status. These

Table 7 Seroprevalence of Brucella abortus antibodies according to reproductive disorder in adult female.

Ab. = Abortion, ROP = Retention of placenta, RB = Repeat breeding, Positive = +Ve, Negative = -Ve, T= Tested; P= Positive

Figures in the parenthesis indicate prevalence rates.

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findings substantiated the views put forth by Masood *et. al.* (1990)

Overall seroprevalence rate of 12.13, 11.47 and 10.43 per cent in female and 8.97, 11.54 and 11.54 per cent in male were recorded by RBPT, STAT and i ELISA in the buffaloes maintained under rural conditions while seroprevalence in buffaloes maintained by organized farms was 6.94, 6.48 and 5.56 in females by respective tests. In case of males, only a solitary case was found positive. Thus, seroprevalence was higher in females. Similar findings were also reported by Vaishali *et. al.* (2005). Higher prevalence among females may be due to more chances of exposure to brucella infection.

Prevalence among unconceived heifers was 2.65 per cent in contrast to pregnant heifers showing higher prevalence rate of 5.00 per cent, supporting findings of Crowford *et. al.* (1987). Dry non pregnant and dry pregnant buffalo showed seropositivity rate of 16.75and 19.82 per cent, respectively. In lactating non pregnant and lactating pregnant stock, the seroprevalence rate was 6.18 and 8.45 per cent, respectively. Similar results were reported by Rajesh *et. al.* (2003) in cattle. Higher prevalence among pregnant buffaloes may be due to pregnancy associated metabolic and immunological functional perturbations.

Prevalence rate of 18.75 per cent in breeding and 5.48 per cent in male buffalo stock was recorded. A much higher prevalence among cattle breeding bulls was reported by Barman *et. al.*(1989). Perusal of herd wise seroprevalence revealed 13.73 per cent in buffalo herd comprising of 16 buffaloes or more. Lowest seroprevalence was found in buffaloes with the herd size of 2-5 animals. Similar observations were recorded by Chatterjee *et. al.*(1985).

Result of i ELISA indicated that seroprevalence of *Brucella abortus* in apparently healthy buffaloes was 8.50 and 3.45 per cent in field and on organized farms, respectively. Overall seroprevalence with the history of abortion (Ab), retained placenta (ROP), repeat breeder (RB), Ab and ROP, Ab and RB, ROP and RB or all three was 20.51, 22.22, 8.82, 11.76, 20.00, 17.65 and 38.09 per cent, respectively. Seropositivity in the buffaloes of organized farms was 3.45 and 14.29 per cent in apparently healthy buffaloes and buffaloes with reproductive problems. Isloor *et. al.* (1998) reported similar observations in buffaloes of organized farms of Karnataka.

Prevalence rate of 8.50, 20.59, 20.00 and 11.76 per cent recorded in apparently healthy, abortion, retained placenta and repeat breeder buffaloes, respectively under field condition were higher than the corresponding rates, 1.94, 7.14, 4.76 and 3.49, reported by Manikam and Mohan (1987) which indicated variation in spread and quantum of infection in different locality. Higher prevalence rate with the history of retained placenta against repeat breeder substantiated the findings of Rahman *et. al.* (1997).

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