PRODUCTION SYSTEMS AND BRUCELLOSIS IN BUFFALOES

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Epidemiological investigations of brucellosis under different production systems revealed a much higher prevalence of this malady in different species of livestock maintained at organised farms (7.0%), compared to those belonging to rural domestic animal holdings (3.5%). Human beings in contact with livestock and livestock products showed higher disease prevalence (11.0%) than those living in the cities. Factors like management and animals' biographics were also analysed.

INTRODUCTION

The importance of brucellosis is primarily due to its public health signilicance being a zoonotic disease and economic losses inflicted to the animal industry (WHO, 1971). The dirty nature of buffalo serves as an exacerbating factor towards widespread contamination of the premises. In recent years, prevalence of the disease in livestock is on rise, particularly in organised livestock farms. The present study was designed to know the prevalence pattern of brucellosis along with epidemiological factors.

MATERIALS AND METHODS

Sero prevalence of *Brucella* antibodies was conducted on 2000 scrum samples collected from buffaloes maintained under three different systems (Table 1).

Table 1. Number of samples collected from buffaloes

Production systems	Age groups			Total
	Sucklcrs	Young stock	Adult	
Govt. Farms	100	200	200	500
Private farms	100	200	200	500
Rural domestic animal holdings	200	400	400	1000

Sera from sheep (1000), goats (1000), equines (225), dogs (150), cats (GO) and human beings (300) were also assayed for *Brucella* antibodies to elucidate the epidemiological aspect (Table 2).

Tahle 2. Samples collected from animals other than buffaloes

Species	Sheep	(;oats	bluincs	Dogs	Cats	Total
No. of Samples Collected	WOO	\000	225	150	(JJ	2435

Standard tube agglutination: Each serum sample was tested in duplicate. Serial two-fold dilutions of the test serum starting from 1:10 up to 1:640 (Volume 0.5 ml) were prepared in phenol saline (0.85% NaCI solution containing 0.5% phenol). The antigen was diluted (as per instructions of Veterinary Research Institute, Lahore i.e. 1 part of antigen and 9 parts of normal saline) and an equal amount was added to each tube. Contents of the tube were mixed thoroughly and incubated at 37'C for 24 hours. The degree 01 agglutination was determined by the degree of clearing without shaking the tube.

Complete agglutination and sedimentation with 100% clear supernatant was marked as ++++. Similarly, 75%, 50% and 25% were marked +++, ++ and +, respectively. No agglutination and no clearing was considered as negative. The highest serum dilution showing 50% clearing (++) was considered as titre of that serum. A titre of 1:40 or higher was considered as true positive as per recommendations of FAO/WHO Expert Committee on brucellosis.

Complete fixation test (CFT): The modified microtitration technique described by Alton and Jones (1975) was used. The starting serum dilution for the test and anticomplementary control was 1:8. Commercial guinea pig complement and rabbit haemolysin were used. The CFT antigen diluted 1:2 was used for the test. The endpoint of the serum titration was taken as the highest dilution at which 50% or less of the red blood cells were lysed (Table 3).

Table 3. Test procedure of complement fixation test (CFT)

	1	2	3	4	5
Serum 1:2 diluted (Ml)	0.2	0.1	0.1	0.1	0.1
Diluent (ml)	-	0.1	0.17	0.17	0.2
Serum final dilution	1:2	1:4	1:10	1:20	1:2
Antigen (Ml)	0.2	0.2	0.2	0.2	0.2
	Incubate at 37° C for 30 min.				
Complement (ml)	0.4	0.4	0.4	0.4	0.4
	Incubate at 37° C for 30 min.				

RESULTS AND DISCUSSION

Of 2000 buffaloes, 500 from Government farms, 500 from private farms and 1000 from rural domestic animal holdings, the prevalence of brucellosis was reckoned to be 7.00% (35),6.20% (31) and 3.5% (35), respectively. Out of 35 buffaloes sero positive at Government farms, the adult buffaloes (200) that have at least parturated once, shared 12.50% (25), whereas, the young ones (200) contributed only 5.0% (10), while sucklers (100) were found negative for *anti-Erythrocella* antibodies. At private farms, the adult (200) and young buffaloes (200) were found to be 11.50% (23) and 4.00% (8) positive for brucellosis. However, at rural domestic animal holdings, the overall prevalence (3.5%) was much lower as compared to that of Government and private farms where the adult buffaloes (400) contributed a share of 7.25% (29) amongst the victims of brucellosis. Only 1.5% (6) buffaloes which were positive for brucellosis belonged to young stock (400). The relationship of sex with brucellosis indicated 5.0% (10), 5.0% (10) and 0.0% (0) male animals positive for brucellosis at Government farms (20), private (20) and rural domestic animal holdings (40), respectively, while among females at Government farms (360), private farms (360) and rural domestic animal holdings (720) of brucellosis was found to be 9.44% (34), 8.33 (30) and 4.86% (35) positive for brucellosis (Table 4).

For the serum samples of sheep (1000), goats(100) horses (225), dogs (150) and cats (70), tested for brucellosis, the prevalence of brucellosis was revealed to be 6.2% (62), 5.9% (59), 5.77% (13), 9.33% (14) and 0.0% (000) respectively. The prevalence of brucellosis in human beings from city, villages and those in contact with the livestock and livestock products was observed to be 1.0% (one) 8.0% (8) and 11.0% (11) respectively. The presence of antibrucella antibodies in sheep, goats, dogs horses and man are clear indicative of the either two modes of spread i.e., Anthropozoonoses and Zooanthcoposes.

The overall high prevalence (7.00%) of brucellosis at Govt. farms was due

seemingly to closed populations, increased stocking density, lack of hygienic and good rnanagcmentl measures as well as improper culling. A little less prevalence (6.20%) at private farms could be ascribed to some factors like introduction of brucella positive reactors, lack of awareness about the zoonotic importance of the disease, lack of culling practices etc.

checked with C.F.T. which revealed little higher positive percentage, 5.25% (105) compared to S.A.T., 5.05% (101), but for convenience *SA.T.* results are discussed in detail. The S.A.T. has also been recommended and found almost equally efficient test Akram, (1991) and Alton and Joncs, (1975).

Table 4 Seroperevence of brucellosis ill buffaloes

Age Groups	Production System					
	Govt. farms		Private farms		Rural domestic	
	No.	% scro-positvic	No.	% scro-positive	No.	% sero-positive
Adults	200	12,50	200	11.50	400	7.25
Young stock	200	5.00	200	4.00	400	1,50
Sucklers	100	-	100	-	200	-
Overall	500	7.00	500	6.20	HXlO	3,50

However, at rural domestic animal holdings, the better hygienic conditions, well ventilated houses and good management can saficty be said as a few ameliorating factors leading to the relatively lower prevalence (3.5%).

The Gcorncan titres (GMT) in buffaloes were calculated as the highest (457.05) at Govt., farms followed in order by that (292.62) of animals at the private farms, while it remained the lowest (183.79) in

Table 5. Standard agglutination titres in seropositive buffaloes

Production system	Number Positvc	SAT TITRE					Geometric mean titre (G.M.T.)
		40	80	160	320	640	
Govt. farms	35	-	1	3	8	23	457.05
Private farm	31	-	6	3	11	11	292.62
Rural domestic	35	2	10	8	9	6	183.79

Results based on S.A.T. are detailed however, negative & doubtful samples were

animals owned under rural domestic holdings (Table 5).

Findings of the present study are lucidly substantiated by the results of Ajmal *et 01.* 1989, Ahmad *et al.,* 1990, Akram, 1991 and Siddique *et al.,* 1993. All the previous workers have recorded a higher prevalence of brucellosis in the adults ie. 3.33, 3.25, 8.8 and 9.10%, compared to the yound ones with 1.72, 1.47, 2.5 and 5.2% prevalence respectively. Ajmal *et al.,* 1989 happened to record a higher prevalence (3.59%) of brucellosis at organised farms than that at the individual holdings (1.72%). Similarly Ahmad *et al.* 1990 observed higher prevalence of brucellosis (5.25%) at Government and private farms and a very low prevalence (1.25%) In animals maintained in villages.

Salman *et al.* 1984 linked the higher rates of brucellosis in animals with area size area, stocking density, artificial insemination with poor hygienic precautions and lack of interest in prophylactic vaccination against Brucellosis. The present investigations attude to the same provocatives thwarting a successful check on the spread of the disease in the country.

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