

Sero-Prevalence of Brucellosis in Small Ruminants of Erstwhile Guntur District, Andhra Pradesh

SreeLakshmi, B.*, K. Lavanya and A. Gurava Reddy

Animal Disease Diagnostic Laboratory, Guntur District, Andhra Pradesh, India - 522001.

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Abstract

A study was conducted to determine the sero-prevalence and to delineate the risk factors for *Brucella* seropositivity in small ruminants of erstwhile Guntur district, Andhra Pradesh. In the present study, a total of 1033 sera samples from small ruminants (798 sheep and 235 Goat) of erstwhile Guntur district were screened using Rose Bengal Plate Test (RBPT) and Indirect Enzyme Linked Immuno sorbent Assay (I-ELISA). Overall Sero-prevalence of Brucellosis in small ruminants was 8% and 21.3% on RBPT and I-ELISA respectively. The prevalence was more in adults (43.9%) than younger ones and more in females (21.8%) than male (19.9%) on I-ELISA.

Keywords: Brucellosis, sero-prevalence, small ruminants, erstwhile Guntur District

Sheep and goats are important species of livestock in India and play a vital role in the rural economy. They not only provide food security, employment and manure but also have great social value (Chopade *et al.*, 2010). Brucellosis is considered to be the most important disease due to its economic impact as it has an adverse effect on total animal protein supplies and severe health hazard to human (Al-Talafhah *et al.*, 2003). Caprine and ovine brucellosis are caused by zoonotic gram-negative, facultative intracellular coccobacilli which belong to the genus *Brucella*. In sheep and goats, Brucellosis is mainly caused by *Brucella melitensis* whereas *Brucella ovis* causes the disease in sheep. Free grazing and frequent mixing of flocks also

contribute to the wide distribution of Brucellosis in sheep and goats. The symptoms in infected sheep and goats are abortions, stillbirths and metritis which may result in temporary infertility. Therefore this study was undertaken with the main objective to screen the sheep and goats in flocks with history of abortions in the eight constituencies of erstwhile Guntur district.

Materials and Methods

A total of 1033 (798 sheep and 235 goat) sera samples were collected in animals with history of abortions in flocks from Bapatla, Repalle, Vemuru, Mangalagiri, Nidubrolu, Tenali, Tadikonda and Prathipadu constituencies of erstwhile Guntur District during 2023-24. After proper restraining of the animal, about 5 ml of blood was collected in red vacutainers (clot activators) from jugular vein. The blood was allowed to clot and serum was separated and samples were stored in 2ml vials at -20°C in laboratory till further analysis. The OIE prescribed Rose Bengal Test (RBPT), Indirect Enzyme Linked Immunosorbent Assay (I-ELISA) were used for diagnosis of Brucellosis in sheep and goats. The RBPT antigen Procured from IVRI and Supplied by Veterinary Biological Research Institute (VBRI), Vijayawada was used for the study. One drop (0.03 ml) of serum sample and one drop of antigen were taken on a glass slide, mixed thoroughly with a spreader and observed for the noticeable agglutination within 4 minutes. Any agglutination or precipitation was considered as positive, whereas no reaction indicated the absence of *Brucella* antibodies in the sera. The I-ELISA test was conducted at Animal Disease Diagnostic Laboratory Guntur and VBRI-AP,

*Corresponding author : Email : adaddlguntur1@gmail.com

Table I : Location wise prevalence of Brucellosis on RBPT and I-ELISA

S.No	Location (constituency)	No of samples tested			Sheep		Goat		Total Sheep & Goat	
		Sheep	Goat	Total	Positives (%)		Positives (%)		Positives (%)	
					RBPT	ELISA	RBPT	ELISA	RBPT	ELISA
1	Bapatla	118	7	125	0 (0.0)	15(12.7)	0 (0.0)	0 (0.0)	0 (0.0)	15 (12.0)
2	Repalle	100	6	106	4(4.0)	24(24)	0 (0.0)	0 (0.0)	4(3.8)	24 (22.6)
3	Vemuru	71	54	125	7 (9.9)	10 (14.1)	7 (13.0)	14(25.9)	14 (11.2)	24 (19.2)
4	Mangalagiri	115	44	159	17 (14.8)	7(6.1)	2(4.5)	1(2.3)	19 (11.9)	8 (5.0)
5	Nidubrolu	88	35	123	1 (1.1)	25(28.4)	3(8.6)	8 (22.9)	4 (3.3)	33 (26.8)
6	Tenali	65	57	122	1 (1.5)	22(33.8)	1(1.8)	14 (24.6)	2 (1.6)	36 (29.5)
7	Tadikonda	113	20	133	11(9.7)	29 (25.7)	3(15)	2 (10.0)	14 (10.5)	31 (23.3)
8	Prathipadu	128	12	140	26 (20.3)	47 (36.7)	0 (0)	2 (16.7)	26 (18.6)	49 (35.0)
	Total	798	235	1033	67(8.4)	179(22.4)	16(6.8)	41(17.4)	83 (8.0)	220 (21.3)
	x ² test (P Value)									315.261** (0.000)

**indicates highly significant at p≤0.01

Table II: Age wise Prevalence of Brucellosis on I-ELISA

S.No	Age	sheep			Goat			Total Sheep and Goat		
		Tested	positive	Positive %	Tested	positive	Positive %	Tested	positive	Positive %
1	<6M	14	2	14.3	2	1	50.0	16	3	18.8
2	6M - 1yr	85	11	12.9	42	7	16.7	127	18	14.2
3	1-2 yrs	288	49	17.0	59	9	15.3	347	58	16.7
4	2-5 yrs	380	100	26.3	122	23	18.9	502	123	24.5
5	>5yrs	31	17	54.8	10	1	10.0	41	18	43.9
	Total	798	179	22.4	235	41	17.4	1033	220	21.3
	x ² test (P Value)									18.779** (.002)

**indicates highly significant at p≤0.01, M indicates months and yrs-years

Vijayawada as per the manufacturer's protocol of ELISA kits. (ID screen Brucellosis Serum Indirect Multi-Species of ID vet Innovative Diagnostics). The intensity of the color was measured by taking OD at 450 nm on ELISA reader. Data obtained from serological tests were analyzed using SPSS version 20.0 for windows. Chi square test was used for the analysis of risk factors like location, age, species and sex. The difference was considered highly significant statistically when $p \leq 0.01$.

Results and Discussion

Overall Seroprevalence of brucellosis in small ruminants was 8% and 21.3% on RBPT and

I-ELISA, however it was 8.4 % and 22.4% in sheep and 6.8% and 17.4% in goats on RBPT test and I-ELISA tests respectively. (Table I). The results were in correlation with Shafy *et al.* (2016), Sonawane *et al.* (2011) and Sai *et al.* (2018), who reported higher prevalence of Brucellosis in sheep than Goats, whereas higher prevalence of Brucellosis in caprine than ovine was reported by Padher *et al.* (2018). The chi-square analysis demonstrated the significant difference of seroprevalance among various constituencies ($P \leq 0.01$). The overall prevalence of brucellosis was higher in Prathipadu (35%), Tenali constituencies (29.5%) followed by Nidubrolu constituency (26.8%). The least preva-

Table III : Sex wise Prevalence of Brucellosis on I-ELISA

S.No	Sex	Sheep			Goat			Total Sheep and Goat		
		Tested	positive	positive%	Tested	positive	Positive %	Tested	positive	Positive %
1	Female	559	130	23.3	192	34	17.7	751	164	21.8
2	Male	239	49	20.5	43	7	16.3	282	56	19.9
	Total	798	179	22.4	235	41	17.4	1033	220	21.3
	x ² test (P Value)									23.000** (.000)

**indicates highly significant at $p \leq 0.01$

Prevalence was found in Mangalagiri constituency (19.2%) on I-ELISA.

A significant difference of sero-prevalence was observed between age groups and different species statistically ($P \leq 0.01$) in Tables II and Table III respectively. The prevalence was more in adults (54.8%) in sheep than younger ones whereas in goat it was more in young ones (50%) than adults. However the overall prevalence in sheep and goat together was more in age group of >5 yr (43.9%) followed by 2-5yrs (24.5%), 1-2yrs (16.7%), <6months (18.8%) and 6M -1yr (14.2%) (Table II). These findings were in agreement with Shafy *et al.* (2016), who also reported more prevalence in adult sheep and goat than younger ones. In the present study seroprevalence was found to be more in female sheep (23.3%) and goats (17.7%) than in male by ELISA method. (Table III). Those findings were in agreement with Shafy *et al.* (2016), Sonawane *et al.* (2011) and Sai *et al.* (2018) who also reported more prevalence in females than in males.

Conclusion

The higher prevalence of Brucellosis recorded in the present study poses a serious risk for small ruminants as well as their owners. There is a dire need to develop effective control and prevention strategies against brucellosis in sheep & goats of this region.

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