



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(9): 1786-1789
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www.thepharmajournal.com
Received: 07-06-2023
Accepted: 15-07-2023

PI Ganesan

Professor & Head, Department of Veterinary Medicine, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

G Sravani

Department of Veterinary Microbiology, N.T.R College of Veterinary Science, Gannavaram, Vijayawada, Andhra Pradesh, India

Status of tuberculosis, Johne's disease and brucellosis in ruminants in an organised farm

PI Ganesan and G Sravani

Abstract

The present study was carried out in an organized livestock farm at Jamdoli, Jaipur in Rajasthan state. The farm possesses 80 animals which include 24 cross bred cattle, 25 Murrah buffaloes, 15 beetle and 16 Sirohi goats. A few animals in this farm both in cattle and goats showed the clinical signs of anorexia, poor weight, low milk yield and abortions. Based on the history of the animals, a detailed investigation was done to rule out the etiological agents responsible for poor performances. Accordingly all the animals above 6 months were tested for tuberculosis by single intradermal test. Johne's disease was tested both by Johnin & ELISA & brucellosis was tested by Rose Bengal antigen test & by ELISA. The study showed 8.33% crossbred cattle, 8% Murrah buffaloes, & 6.45% goats were positives for tuberculosis. The tests for J.D collectively showed 12.5% cattle, 16% Murrah buffaloes & 19.35% goats as positives. Studies on brucellosis showed 12.5% crossbred cattle, 20% Murrah buffaloes & 12.9% goats as positives. Overall studies revealed 7.5, 16.25 & 15% of the farm animals were tested positive for tuberculosis, Johne's disease & brucellosis respectively. The study indicated the prevalence status of the farm for tuberculosis, J.D & for brucellosis.

Keywords: Ruminants, prevalence, mycobacterium, brucella

Introduction

Tuberculosis and Johne's disease are chronic wasting diseases caused by Mycobacterium species. Brucellosis is an important reproductive disease causing heavy economic loss. The above three diseases are endemic in India. Hence regular monitoring of these diseases is mandatory in all farms throughout the nation. In this study screening of the above diseases were carried out in an organized farm in Jamdoli, Jaipur city. Since few animals both in cattle and caprine population suffered with the clinical manifestations of anorexia, weight loss and low milk yield, the farm authorities requested investigation to make a disease free status of the farm. A detailed investigation carried out to know the status of the chronic mycobacterial infections and brucellosis.

Tuberculosis in cattle and goat population

Gill JPS *et al* (2000) ^[9] reported an overall prevalence of 11.80% in cattle and 10.67% in buffaloes in Punjab state of India. Shringi B. N (2004) ^[16] reported 4.8% of bovine tuberculosis in Rajasthan state. Ganesan. P.I. (2012) ^[5] recorded 49.2% as reactors to bovine tuberculin using Single intradermal test (SID) in Tamil Nadu in an organized farm. Srinidhi Srinivasan (2018) ^[18] analyzed the prevalence of bovine tuberculosis status in India by meta-regression model at the level of 7.3%. Chhaya P Sonekar *et al* (2022) ^[3] reported 4% *Mycobacterium bovis* reactors in goats by SID in Nagpur. Ganesan P.I. (2019) ^[8] reported 5.47% to tuberculosis in caprine population using SID in Tamil Nadu.

Johne's disease in cattle and goat population.

Vinodkumar & Ganesan P.I. (2011) ^[19] reported an overall prevalence of JD in organized farms to be 11.89% in cattle and 11.20% in buffaloes in Tamil Nadu using by all diagnostic tests. Kundan Kumar Chaubey *et al* (2017) ^[12] reported 23% of goat population in India affected with; *M. paratuberculosis* by culture, ELISA & PCR. Singh S.V, Vihan V S (2004) ^[15] reported a bio-load of 20.0-69.8% in goat milk in Mathura. Ganesan P.I. (2019) ^[8] reported 5.49% of goat population in Tamil Nadu tested positive for J.D.A.V. Singh *et al* (2016) ^[3] reported a sero-positivity of 29.9 in cattle, 20.2 in buffaloes & 23.9% in goats in India including Rajasthan state for J.D.

Corresponding Author:

PI Ganesan

Professor & Head, Department of Veterinary Medicine, Apollo College of Veterinary Medicine, Jaipur, Rajasthan, India

Johne's disease in cattle, buffalos & goats

A.V. Singh *et al* (2019) [2] reported 26.9% in cattle, 20.3% in buffaloes & 23.9% in goats were positives by ELISA for J.D in India including Rajasthan state.

Brucellosis in cattle and goat population

Ganesan P.I. & Anuradha. P. (2006) [4] reported 13.5% positive bovine brucellosis cases in Tamil Nadu using Dot ELISA. In a national survey of bovine brucellosis (1994-2011) by PD-ADMAS, an average of 5% of cattle & 3% of Buffaloes were infected with brucellosis in India & in Tamil Nadu 9.3% of cattle & 0.5% of buffaloes were affected (Ranukharadhaya *et al* 2002) [14]. Jai Anand *et al* (2006) [10] reported 15.07% positivity in dairy animals for bovine brucellosis using Milk- ELISA in certain districts of Tamil Nadu. Anuradha P. & Ganesan P.I. (2006) [4] reported 17.5% in cross bred cows in an organized farm in Tamil Nadu for brucellosis using C-ELISA. Ganesan P.I. (2012) [5] reported 8.88% sera samples were positive by C-ELISA in an organized farm at Nilgris, Tamil Nadu. Preena *et al* (2015) [13] reported 21.35% of cattle were positive for anti *Brucella abortus* antibodies from various organized farms in Tamil Nadu. Ganesan P.I (2013) [6] reported 12.5% as positives for *brucella abortus* using Dot-ELISA from endemic areas of Tamil Nadu.

Gill JPS *et al* (2000) [9] reported an overall prevalence of 3.60% in goats in Punjab state of India. Kumar P. *et al* (2007)

[11] reported 30.7-70.1% of goat population tested positive by ELISA in Mathura. Sonawane G.G *et al* (2011) [17] reported 4.67% of goats were tested positive by ELISA in certain districts of Rajasthan for brucellosis. Ganesan. P.I (2013) [6] reported 7.37% positivity in elite cows for Brucellosis in selected districts of Tamil Nadu.

Ganesan P.I (2013) [6] reported 1.68, 1.02 & 7.37% positivity in elite cows for Tuberculosis, Johne's disease & Brucellosis respectively in selected districts of Tamil Nadu. In another study Ganesan P.I. (2019) [8] reported 5.47 & 5.94% positive reactors for tuberculosis and J.D in caprine population using SID in Tamil Nadu.

Materials and Methods

Out of 80 animals in this farm, few animals both in cattle and caprine populations suffered with anorexia, weight loss, low milk yield & abortion. Based on the history, all animals in the farm were tested to tuberculosis, J.D & Brucellosis. The tested animals included 24 cross bred cattle, 25 Murrah buffaloes, 31 caprines which included 15 Beetle & 16 Sirohi. All the animals above 6 months were tested for tuberculosis using tuberculin by single intradermal test. Johne's disease was tested both by johnin & ELISA & brucellosis was tested by Rose Bengal plate antigen & by ELISA.

Results and Discussion

Table 1: Status of tuberculosis, J.D and brucellosis in ruminants in the farm.

Animal species	No. of animals tested	TB positive	J.D positive	Brucellosis positive
Cross bred Cattle	24	2(8.33%)	3(12.5%)	3(12.5%)
Buffaloes-(Murrah)	25	2(8%)	4(16%)	5(20%)
Bovine total	49	4 (8.16%)	7(14.2%)	8(16.32%)
Caprine 1. Beetle	15	1 (6.66%)	2(13.33%)	2(13.33%)
2. Sirohi	16	1 (6.25%)	4 (25%)	2(12.5%)
Caprine total	31	2(6.45%)	6(19.35%)	4 (12.90%)
Overall total	80	6 (7.50%)	13(16.25%)	12(15.00%)

Tuberculosis in Cattle

In this study 24 cross bred cattle & 25 Murrah buffaloes were screened against tuberculosis in which 8.33 & 8% (2 animals in each) were found positive for tuberculosis in cross bred cattle & buffaloes respectively. In bovines out of 49 cattle tested, an overall percentage of 8.16 (4 cattle) animals were found positive for tuberculosis. The prevalence of bovine tuberculosis was reported by various authors in India. Gill JPS *et al* (2000) [9] reported an overall prevalence of 11.80% in cattle and 10.67% in buffaloes in Punjab state of India. Shringi B.N *et al* 2004; Ganesan P.I. 2012 & Srinidhi Srinivasan (2018) [16, 18, 5] reported prevalence values of 4.8, 49.2 & 7.3% respectively in Rajasthan & in Tamil Nadu. In this study also the prevalence of cattle tuberculosis is on elevated level which coincides with the finding of the mentioned authors.

Tuberculosis in goats

In caprine 15 numbers of Beetle & 16 numbers of Sirohi were tested for tuberculosis in which 6.66 & 6.25% (One animal in each) goats were found positive for tuberculosis. In caprine an overall percentage of 6.45 (One goat in each) animals were found positive for tuberculosis in this farm. Chhaya P Sonekar *et al* (2022) [3] reported 4% tuberculin reactors in goats by SID in Nagpur. Ganesan P.I (2019) [8] reported the prevalence of tuberculosis in goat population in Tamil Nadu at the level of

5.47%, which is in agreement with the observation in this farm.

J.D in cattle

In this study 24 Cross bred cattle & 25 Murrah buffaloes were screened against J.D in which 12.5 & 16% (3 crossbred & 4 Murrah buffaloes) were found positive for J.D. Out of 49 cattle tested 7 cattle (14.21%) were found positive for J.D. Ganesan P.I. (2019) reported 5.49% of goat population in Tamil Nadu tested positive for J.D. Vinodkumar & Ganesan. P.I (2011) [19] reported 11.89% cattle and 11.20% buffaloes were tested positive for J.D in Tamil Nadu. Kundan Kumar Chaubey *et al* (2017) [12] reported 43 & 36% of cattle & buffaloes affected with *mycobacterium paratuberculosis* respectively in India. The finding from this farm is in agreement with the works carried out by the above authors.

J.D in goat

In caprine 15 Beetle & 16 Sirohi were tested for J.D in which 13.33 (2 Beetle) & 25% (4 Sirohi) were found positive for J.D. In caprine an overall percentage of 19.35% (6 goats) animals were found positive for J.D in this farm. Singh S.V, Vihan V S (2004) [15] reported a bio-load of 20.0-69.8% in goat milk in Mathura. The prevalence of J.D in goat in India was studied by Kundan Kumar Chaubey *et al* (2017) [12] at a level 23%. Where Ganesan P.I. (2019) [8] from Tamil Nadu reported

5.49% of goats tested positive for J.D.A.V. Singh *et al* (2016)^[3] reported 26.9% in cattle, 20.3% in buffaloes & 23.9% in goats were positives by ELISA for J.D in India including Rajasthan state. Observation from this farm animal i.e. the goat population on the prevalence of J.D infection coincides with the observations of the above mentioned workers.

Brucellosis in cattle

In this study 24 Cross Breed cattle & 25 Murrah buffaloes were screened against brucellosis in which 12.5%(3 animals) in cross bred cattle & 20% Murrah buffaloes (Five animals) were found positive for brucellosis. Out of 49 cattle tested for bovine brucellosis 16.32% (8 cattle) animals were found positive. Ranukharadhaya *et al* (2002)^[14] summarized the prevalence of bovine brucellosis at 5% and 3% in cattle & buffaloes respectively by a national survey (1994-2011) in India for brucellosis& in Tamil Nadu 9.3% of cattle & 0.5 of buffaloes were posted as positives. Jai Anand *et al* (2006)^[10] reported 15.07% positivity in dairy animals for bovine brucellosis using Milk-ELISA in certain districts of Tamil Nadu. Anuradha P & Ganesan. P.I. (2006)^[4] reported 17.5% in cross bred cows in an organized farm in Tamil Nadu for brucellosis using C-ELISA. Ganesan P.I. (2012: 2013)^[5, 6] reported 8.88% as positive by C-ELISA in an organized farm at Nilgris, Tamil Nadu and 12.5% as positives by Dot-ELISA from endemic areas of Tamil Nadu. Preena *et al* (2015)^[13] reported 21.35% of cattle as positives from various organized farms of Tamil Nadu. The present study on bovine brucellosis in this farm is also confirms the findings of the above authors.

Brucellosis in goat

In caprine 15 Beetle & 16 Sirohi were tested for brucellosis in which 13.33 & 12.5% (2 goats in each) were found positive for Brucellosis. In caprine an overall percentage of 12.9% (4 goats) were found positive for brucellosis. Many authors reported the prevalence of brucellosis in India. Ganesan. P.I (2013)^[6] reported 7.37% positivity in goat population from certain districts of Tamil Nadu. Sonawane G.G *et al* (2011)^[17] reported 4.67% of goats as positives by ELISA in certain districts of Rajasthan for brucellosis. Kumar P.*et al* 2007^[11] reported 30.7-70.1% of goat population tested positive by ELISA in Mathura. Gill JPS *et al* (2000)^[9] reported an overall prevalence of 3.60% in goats in Punjab state of India. Findings of these authors confirm the prevalence of goat brucellosis in this farm also.

Overall studies revealed the percentage of 7.5, 16.25 & 15% animals as positives for tuberculosis, J.D & brucellosis in this farm respectively.

Conclusions

The studies on the status of tuberculosis, J.D & brucellosis were carried out in an organized farm as per the request of the farm authorities in Jamdoli, Jaipur city, since few animals both in cattle and caprine population suffered with the clinical manifestations of anorexia, weight loss, and low mild yield. Based on the above clinical picture screening of all the bovine and caprine stocks were carried out. The study revealed an overall percentage of 7.5, 16.25 & 15% as positive animals for tuberculosis J.D & brucellosis in this farm respectively. Hence regular monitoring of the farm animals suggested for mycobacterial infections and brucellosis to avoid economic loss in the farms.

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