



Seroprevalence of leptospirosis in cattle in Mannancherry panchayat of Alappuzha district*

S. S. Sreekutty¹, K. Vrinda Menon², C. Latha³, B. Sunil⁴, R. Ambily⁵

Department of Veterinary Public Health, College of Veterinary and Animal Sciences, Mannuthy, Thrissur-680651. Kerala Veterinary and Animal Sciences University

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Abstract

Cattle can act as asymptomatic carrier in leptospirosis and can transmit the infection to other animals and humans either by direct contact or indirectly by contaminating the environment with infected urine. Thus, the role of apparently healthy cattle in the maintenance and transmission of the organism needs to be studied. The present study was conducted in 90 apparently healthy cattle in Mannancherry panchayat of Alappuzha district. Serum samples were collected from cattle and subjected to Microscopic Agglutination Test (MAT) using a battery of serovars. A serum dilution of 1:50 and above was taken as positive. Out of the 90 samples analysed, 47 (52.2 per cent) were found positive. The predominant serovars observed in the study were Grippotyphosa (34.04 per cent), Sejroe (25.53 per cent) and Autumnalis (21.3 per cent). The study revealed the importance of asymptomatic cattle in the maintenance and transmission of the disease.

Key words: Asymptomatic cattle, Alappuzha, Microscopic Agglutination Test, Predominant serovars

Leptospirosis is a worldwide anthroponozoonotic disease caused by the pathogenic spirochete bacterium of the genus *Leptospira*. Since warm and humid atmospheric conditions favours the survival of the organism in the environment, it is more prevalent in the tropical and subtropical regions compared to temperate regions (Sperber and Schleupner, 1989). Among domestic animals, leptospirosis in cattle has been linked with economic losses mainly due to decrease in milk yield, abortion, mastitis and infertility. Cattle act as inapparent carrier of leptospires as they can carry the organisms in their renal tubules and can excrete them in urine for months,

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1. MVSc Scholar, Email id: sreekuttyssreekumar810@gmail.com
2. Assistant Professor
3. Professor and Head
4. Professor
5. Assistant Professor, Department of Veterinary Microbiology

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thereby transmitting the infection to other animals and humans through the contaminated environment (Maxie Grant and Newman, 2008). Usually, in maintenance hosts, the infecting serovar may have lower pathogenicity which causes chronic rather than acute infection contrary to accidental hosts (Jose *et al.*, 2018).

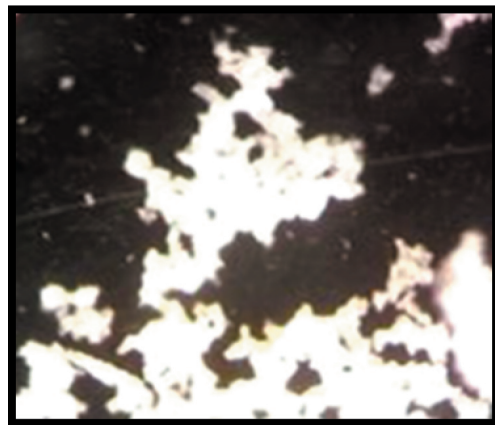
Even though the disease occurs throughout the year, a higher incidence has been recorded in rainy season because the organism has the ability to sustain in stagnant water, ponds, slow moving water bodies and in slightly alkaline water for a longer time (Levett, 2001). Kerala is highly endemic for leptospirosis which usually suffers post-monsoon outbreaks of the disease among humans and animals (Vijayachari *et al.*, 2008). Knowledge about the common leptospiral serovars circulating in local animal populations is necessary to determine sources and transmission routes for the infection in humans (Hartskeerl *et al.*, 2011). The present study aimed at assessing the seroprevalence of leptospirosis in apparently healthy cattle in Mannancherry panchayat of Alappuzha district where higher cattle population and higher incidence of the disease in humans were observed.

Materials and methods

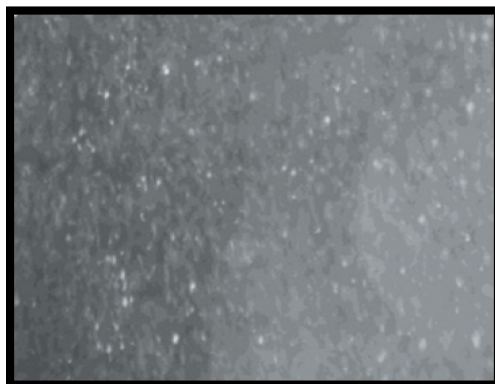
In the present study, 50 serum samples were collected from apparently healthy cattle of Mannancherry panchayat of Alappuzha district during November, 2018. The samples were stored at -20°C until use. All the serum samples were subjected to Microscopic Agglutination Test (MAT) using a panel of twelve live leptospiral antigens- Australis, Autumnalis, Bataviae, Canicola, Grippotyphosa, Hebdomadis, Icterohaemorrhagiae, Javanica, Pomona, Pyrogenes, Sejroe and Tarassovi. The MAT procedure was performed according to the procedure of Faine (1982) with slight modifications in the final dilution of MAT procedure which was made to 1:50 since the study was done in apparently healthy cattle (Sharma *et al.*, 2006). Further, quantitative assay was carried out against the reacting serovars of leptospires according to Faine (1982) upto a dilution of 1:6400. The reciprocal of the highest dilution of the serum which showed 50 per cent



1:50 dilution



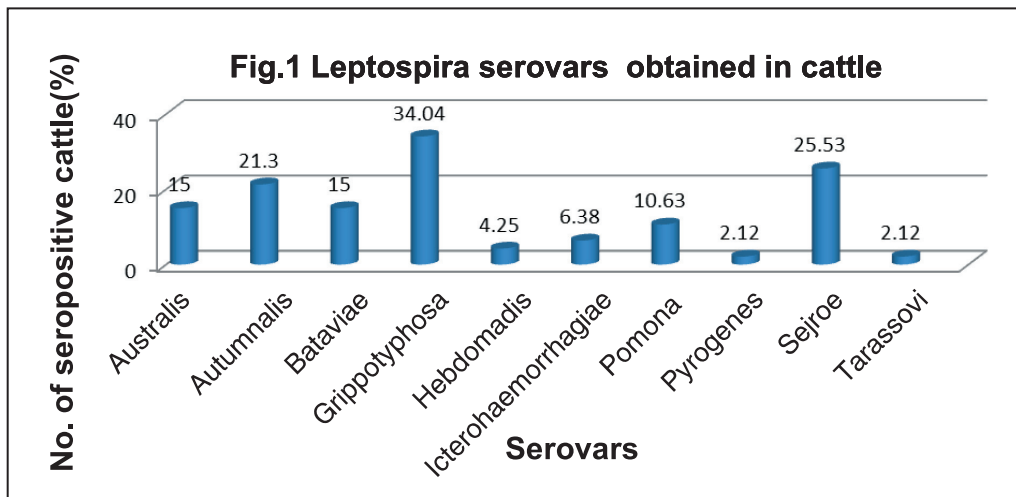
1:100 dilution



Negative control

Microscopic Agglutination Test (MAT) in C

agglutination or 50 per cent reduction in the number of free leptospires in comparison to control was considered as the respective titre.



Results and Discussion

All the cattle involved in the study were apparently healthy. Out of the 90 samples analysed by MAT, 47 (52.2 per cent) were found positive where 23 were positive at 1:50 dilution, 17 at 1:100 dilution and seven at 1:200 dilution. The serovars obtained were Grippotyphosa (34.04 per cent), Sejroe (25.53 per cent), Autumnalis (21.3 per cent), Bataviae (15 per cent), Australis (15 per cent), Pomona (10.63 per cent), Icterohaemorrhagiae (6.38 per cent), Hebdomadis (4.25 per cent), Pyrogenes (2.12 per cent) and Tarassovi (2.12 per cent) as shown in Fig.1

In the present study, 52.2 per cent seropositivity was observed in apparently healthy cattle in Mannancherry panchayat at a dilution between 1:50 and 1:200. According to OIE (2018), an antibody titre of 1:100 or more was considered as positive for leptospirosis in animals. However due to high specificity of the MAT, lower titres could be taken as evidence of previous exposure to the organism. Favero *et al.* (2017) stated that even though a titre of 1:100 or higher in the MAT is an indicator of the disease, a titre of 1:50 indicated animal exposure to the etiological agent. Thus, a titre of 1:50 and above was considered as positive in the present study.

The results obtained were in accordance with the study by Soman *et al.* (2014) where a seropositivity of 47 per cent in apparently healthy cattle was observed in

Central and North Kerala at a serum dilution of 1:80 and more. Similar study was conducted by Balamurugan *et al.* (2013) where a seropositivity of 48.5 per cent was reported in apparently healthy cattle which had history of abortions and other reproductive disorders. The predominant serovars observed in the present study were Grippotyphosa (34.04 per cent), Sejroe (25.53 per cent) and Autumnalis (21.3 per cent) which was in accordance with the findings of Rani *et al.* (2013) in apparently healthy cattle in Andhra Pradesh where the predominant serovars were Grippotyphosa, Autumnalis and Sejroe with a seropositivity of 19.01 per cent. Soman *et al.* (2014) observed Hardjo as the predominant serovar whereas Canicola was not detected in any of the samples from apparently healthy cattle in Thrissur which is in agreement with the present study. The higher seroprevalence in the study may be because the samples were collected during post flood period when the environmental conditions were favourable for the survival and propagation of the organism. Vegad and Katiyar (2001) mentioned that infected cattle can void leptospires in their urine for a period ranging between 10-118 days. Thus, the higher prevalence of anti-leptospiral antibodies in cattle in the present study indicated greater possibility of transmission of the disease by these animals mainly through excretion in urine. This can contaminate the environment and transmit the infection to other animals and humans. The presence of water logged areas, rodent infestation in the vicinity and environmental temperature also would

have favoured the perpetuation of leptospires in the environment.

Conclusion

The higher seroprevalence of leptospirosis in the present study indicates endemicity of the disease in the area and the role played by apparently healthy cattle in the maintenance and transmission of the disease. A comprehensive approach to understand the epidemiology of leptospirosis needs to be undertaken preferably through a 'One Health' approach to know the role of cattle, human and environment in the disease transmission for the effective implementation of preventive strategies against leptospirosis.

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