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Prevalence of Anaplasmosis Caused by *Anaplasma marginale* in Cattle in and around Puducherry Region, India

B. Subramanian[1*], P. Vijayalakshmi[1], S.S. Das[2] and D. Selvi[1]

[1]Department of Veterinary Medicine, Teaching Veterinary Clinical Campus, Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry–605009, India
[2]Department of Veterinary Parasitology, Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry–605009, India

**Corresponding author*

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A B S T R A C T

The present study was conducted in cattle brought to Large Animal Medicine Unit, Teaching Veterinary Clinical Campus, Rajiv Gandhi Institute of Veterinary Education and Research and Ambulatory clinic for treatment of various medical ailments from June 2017 to November 2017. Seventy three cases with clinical signs of pale to icteric mucous membrane and tick infestation were subjected for blood smear examination and Polymerase Chain Reaction (PCR). Out of these fifteen cattle were found positive for *Anaplasma marginale* infection either by blood smear and / by PCR, accounting to an overall prevalence of 20.55 percent The ticks collected from those animals were identified based on morphological features as *Rhipicephalus appendiculatus.*

Introduction

The genus *Anaplasma*, Rickettsiales: Anaplasmataceae are obligate intracellular etiological mediator distressing tick borne diseases in mammalian hosts (Dumler *et al.*, 2001).They infect mature erythrocytes by an endocytic process and reproduction occurs by binary fission to produce 2-8 infective initial bodies which leave the cell by exocytosis to infect other erythrocytes (Radostits *et al.*, 2010). Of the three erythrocytic *Anaplasma* spp., two infects cattle, namely *Anaplasma marginale* and *Anaplasma centrale* whereas *Anaplasmaovis* infects sheep and goat was also well recognized (Lestoquard, 1924).

Clinical anaplasmosis was first recorded in cattle from the State of Odisha, India by Patnaik (1963). Later, In Canada Boulanger *et al.*, (1971) stated the first occurrence of anaplasmosis arose in the year 1971. Office of the International Epizootics (2003) stated that anaplasmosis is presently categorized in List B of the Terrestrial Animal Health Code due to its socio-economic status and consequence in

terms of restrictions in the global trade of animals and animal products. Predominance of *A. marginale* was found to be 48.75 % by molecular procedures in seven districts of Punjab, India (Ashuma *et al.,* 2013). OIE (2013) in North India, 20 outbreaks of anaplasmosis arose during the period of January to June 2013, out of which five were stated from Jammu and Kashmir, six from West Bengal and nine from Punjab, signifying the hazard stood on livestock by the disease.

Anaplasmosis is reflected as one of the top 10 economically significant rickettsial diseases distressing ruminants in India (Srikant and Gaurav, 2014). Abdela *et al.,* (2017) reported prevalence of bovine anaplasmosis as 6.1% by Giemsa staining in Jimma region of Ethiopia. Twenty different species of ticks transmitting anaplasma (Kocan *et al.,* 2004), comprising of *Hyalomma* spp., *Rhipicephalus* spp., *Boophilus* spp., *Ixodes* spp. and *Demacentor* spp.

Though *Boophilus microplus* is found to be the chief transmitting agent (Aubry and Geale, 2011). Mechanical spread is probable by biting flies or blood-contaminated fomites (Brayton *et al.,* 2005). The cause of infection is constantly the blood of an infested animal. Predominance of anaplasmosis is found greater in warm and moist weather accompanying with the plenty of vector (Kocan *et al.,* 2004).

Materials and Methods

Cattle brought to Large Animal Medicine Unit, Teaching Veterinary Clinical Campus, Rajiv Gandhi Institute of Veterinary Education and Research and Ambulatory clinic for treatment of various medical ailments in that seventy three cases with clinical signs of pale to icteric mucous membrane and tick infestation were subjected for blood smear examination and PCR.

A systematic clinical examination was carried out and ticks, if existing were collected and exposed for identification of the species. The ticks collected were immediately processed for identification with DPX mount and were observed under light microscope with 4x magnification.

Results and Discussion

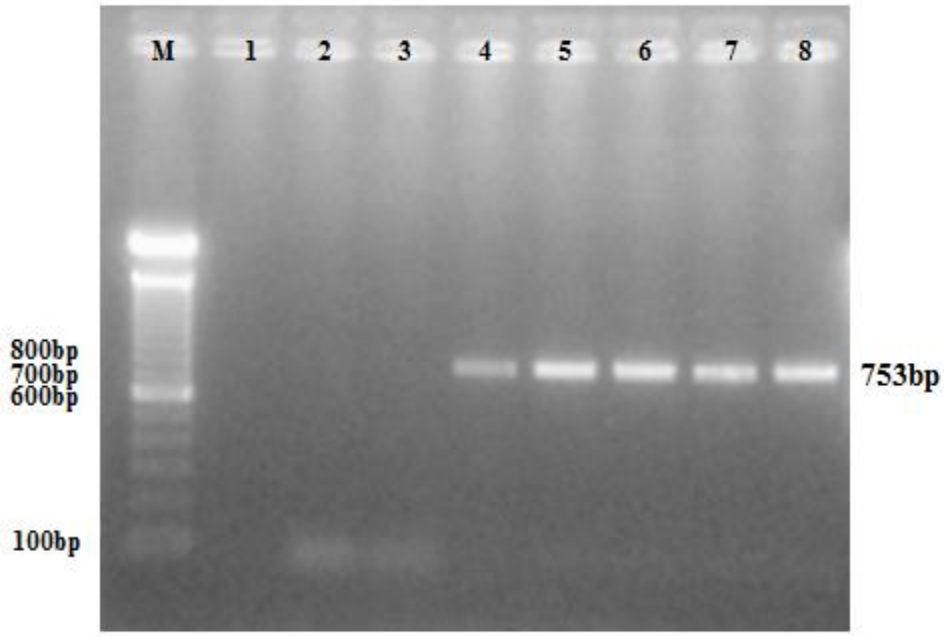
Seventy three cases with clinical findings of pale to icteric mucous membrane and tick infestation were subjected for blood smear examination and PCR. Out of these, 15 were found positive for *A. marginale* infection either by blood smear and or by PCR. The occurrence of Anaplasmosis in cattle in Puducherry region is 20.55% among the tick-borne diseases.

PCR was found to be more sensitive for the detection of *A. marginale***,** out of 73 anaplasmosis suspected samples, 15 were found to be positive for *A. marginale* (Fig. 1) while only three turned positive by blood smear examination.

Out of 15 cattle found positive for anaplasmosis, 10 cattle (66.67%) were infested with ticks. The ticks collected from those animals were identified based on morphological features as *Rhipicephalus appendiculatus* (Fig. 2 and 3).

The prevalence of Anaplasmosis in cattle in Puducherry region was 20.55%, this was compared with the incidence reports from different regions of India. Nair *et al.,* (2013) reported 16.67% incidence in four districts of Kerala. An incidence of 22% anaplasmosis in Telangana was documented by Neena *et al.,* (2017) while in Seemandhrathe incidence was reported to be 3.4%. The ticks collected from the affected animals were identified based on morphological features as *Rhipicephalus appendiculatus.*

Fig.1 Agarose gel electrophoresis of PCR product of *Anaplasma marginale*



Lane M - 100bp DNA ladder; Lane 1 - Negative control; Lane 2 to 8–Samples

Fig.2 and Fig.3 *Rhipicephalus appendiculatus* (DPX mount – 4X)

This was in agreement with Yamada *et al.*, (2008) who stated that *A. marginale* was transmitted by *Rhipicephalus appendiculatus*. However Robert *et al.*, (2009) stated that *R. appendiculatus* showed comparatively low finding rate / transmission for *A. marginale* infection. Fyumagwa *et al.*, (2009) in his study proposes that this tick species is possibly infected by many more of the recognized tick-borne pathogens than it was believed before and is the most significant tick species in transmitting a extensive range of tick-borne diseases in eastern, central and southern Africa where the tick species is widespread. However, no studies have evaluated their competence in the transmission of *Anaplasma marginale* in Puducherry region.

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