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## Short Communication

# Seroprevalence of Peste Des Petits Ruminants in Goats in Assam, India

<sup>1</sup>Safeeda Sultana Begum, <sup>1</sup>Gauranga Mahato, <sup>2</sup>Paresh Sharma, <sup>1</sup>Krishna Sharma, <sup>3</sup>Mokhtar Hussain, <sup>1</sup>Bipin Chandra Das, <sup>1</sup>Jakir Hussain, <sup>4</sup>Ankan De, <sup>5</sup>Dheeraj Choudhary, <sup>5</sup>Muthannan Andavar Ramakrishnan and <sup>5</sup>Dhanavelu Muthuchelvan

<sup>1</sup>College of Veterinary Science, Khanapara, Guwahati, Assam 781022, India

<sup>2</sup>North East Regional Disease Diagnostic Laboratory, Khanapara, Guwahati 781022, Assam, India

<sup>3</sup>ICAR-National Research Centre on Yak, Dirang 790101, Arunachal Pradesh, India

<sup>4</sup>College of Veterinary Science and Animal Husbandry, Tripura West 799008, India

<sup>5</sup>Division of Virology, Indian Veterinary Research Institute, Mukteswar, Uttarakhand 263 138, India

## Abstract

Peste des petits ruminants (PPR) is an economically important viral disease of goats and sheep. The present study reports the seroprevalence of PPR in goats from five districts of Assam in North -Eastern India. On analysis of random goat sera (n = 918) revealed overall prevalence rate of 13.18% with a high prevalence in Kamrup (22.65%) and Nalbari (22.22%) districts and low prevalence in Barpeta (3.25%) district. Further, the prevalence rate was higher in >6 months (15.79%) than in <6 months (12.32%) age group. The study indicating wider circulation of PPRV in this region and warrant vaccination of the susceptible population for proper control of disease.

**Key words:** Peste des petits ruminants, antibody detection, competitive ELISA, seroprevalence

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**Corresponding Author:** Dhanavelu Muthuchelvan, Division of Virology, Indian Veterinary Research Institute, Mukteswar, Uttarakhand, 263138, India

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**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Peste des petits ruminants (PPR) is an economically important viral disease, mainly affects the small ruminants in the Africa, Middle East and Asia. Considering the economical impact of the disease, the FAO and the World Organisation for Animal Health (OIE) launched the global campaign to eradicate PPR by 2030 (<http://www.fao.org/ppr/en/>). The morbidity and mortality rate varies and can go up to 100% in naïve population. The disease occurs throughout the year and affects all age groups. The severity of the disease is more in younger than adult animals. In general, the disease is more severe in goats than sheep. The typical symptoms of the disease are pyrexia, oculonasal discharges, necrotising and erosive stomatitis, enteritis and pneumonia followed by recovery or death (Balamurugan *et al.*, 2014; Muthuchelvan *et al.*, 2015; Sen *et al.*, 2010). The causative agent, PPR Virus (PPRV) is a member of the genus Morbillivirus, subfamily Paramyxovirinae, family Paramyxoviridae in the order Mononegavirales (ICTV., 2012). The virus occurs as a single serotype and is antigenically similar to rinderpest virus. The molecular epidemiological studies with partial Nucleocapsid (N) and Fusion (F) gene sequences classified the PPRV into four distinct lineages (I-IV) (Dhar *et al.*, 2002; Muthuchelvan *et al.*, 2014). As the virus is a single serotype, the vaccine virus from any lineage should protect other viral lineages also. The lineage IV viruses were initially identified exclusively in Asia (Asian lineage) and now being reported at various countries of Africa (Parida *et al.*, 2015).

India harbours one of the largest sheep (65.07 million) and goat (135.17 million) population in the world (<http://dahd.nic.in/dahd/WriteReadData/Livestock.pdf>). The disease was first reported in 1987 in Tamil Nadu state and later the presence was reported from other parts of the country (Muthuchelvan *et al.*, 2015; Nanda *et al.*, 1996; Shaila *et al.*, 1989). Due to the endemicity of the disease, the Govt. of India launched a national level control program during 2010-2011 with a aim to vaccinate all susceptible goats and sheep (Muthuchelvan *et al.*, 2015). For effective control strategies, it is imperative to understand the epidemiological pattern of the disease. Although, the epidemiology of PPR has been fairly studied, reports on the incidence and seroprevalence are very limited for the North-Eastern India (Balamurugan *et al.*, 2014; Muthuchelvan *et al.*, 2014). The present study reports the seroprevalence of PPR in the selected districts of Assam state of North-Eastern India.

## MATERIALS AND METHODS

The present study was conducted during the year 2012-2013 in the state of Assam. A total of 918 goat serum samples were collected from five districts of Assam (Jorhat, Darrang, Nalbari, Kamrup and Barpeta ) and animals were not vaccinated against PPRV at the time of sampling. The samples were analyzed using competitive ELISA (cELISA) kit as per method described (Singh *et al.*, 2004a). Samples with Percentage Inhibition (PI) of  $\geq 40\%$  were considered positive for PPR specific antibodies.

The apparent and true prevalence were calculated as described elsewhere (Balamurugan *et al.*, 2014) and the confidence interval (95% CI), Mean  $\pm$  SE and  $\chi^2$  test were estimated using Statistical Analysis System (SAS) software version 9.3 package (SAS India Ltd., Mumbai).

## RESULTS AND DISCUSSION

Assam is a North-Eastern Indian state located in the Eastern Himalayas and shares international border with Bhutan and Bangladesh. The majority of residents of Assam carry out backyard farming as one of their main socioeconomic activity. The main livestock species maintained are goats (6.16 million), sheep (0.23 million), cattle (10.3 million) and pigs (1.64 million). The PPR is considered as an emerging/re-emerging disease in the state. In our earlier report, we have investigated a PPR outbreak in the Indo-Bangladesh border area of Tripura state, where in the virus strain involved in the outbreak was found to be lineage IV and is closely related to Bangladeshi strains (Muthuchelvan *et al.*, 2014).

The present study investigated the seroprevalence of PPRV in goats from five districts of Assam. Since goat meat is preferred in the state, goat rearing is practiced widely. At the time of sampling, all the five districts were not performing vaccination against PPRV. In the earlier study, the presence of PPRV was confirmed by s-ELISA and PCR from three districts viz., Kamrup, Nalbari and Jorhat (Balamurugan *et al.*, 2014). A total of 918 goat serum samples were randomly collected mainly from rural areas. District-wise and age-wise data are presented in Table 1. The overall prevalence of PPR in the region was 13.18% (CI: 5.54-20.82) across five districts, with a high prevalence in two districts, (Kamrup (22.65%), Nalbari (22.22%)) and low prevalence in Barpeta (3.25%) district indicating wider circulation of PPRV in this region. The age-wise distribution revealed that the prevalence rate was

Table 1: Seroprevalence of PPRV in goat population of five districts of Assam between 2012 and 2013

Names of the district	Total number of samples screened	Positive in competitive ELISA	Apparent prevalence (%)	True prevalence (%)	Age-wise prevalence	
					<6 months	>6 months
Jorhat	91	7	7.69	7.67	4/67 (5.97%)	3/24 (12.5%)
Darrang	264	11	4.17	4.14	3/192 (1.56%)	8/72 (11.11%)
Nalbari	153	34	22.22	22.20	27/127 (21.26%)	7/26 (26.92%)
Kamrup	287	65	22.65	22.63	49/195 (25.13%)	16/92 (17.39%)
Barpeta	123	4	3.25	3.23	2/109 (1.83%)	2/14 (14.29%)
Total	918	121	13.18	13.16	85/690 (12.32%)	36/228 (15.79%)
Mean ± SE			3.18 ± 3.90 (CI: 5.54-20.82)	13.16 ± 3.90 (CI: 5.52-20.80)	12.32 ± 4.51 (CI: 3.48-21.16)	15.79 ± 2.54 (CI: 10.81-20.77)

higher in >6 months group (15.79%, CI: 10.81-20.77) than in <6 months group (12.32%, CI: 3.48-21.16). In a previous study, Balamurugan *et al.* (2014) reported a prevalence rate of 18.07% in goats from Assam with a limited number of samples (n = 105). The present study carried out with moderate number of samples (n = 918), which showed overall prevalence rate of 13.18% which is in agreement with the overall prevalence of 11.63% for the entire North-Eastern region (Balamurugan *et al.*, 2014). However, this rate is much lower to the national prevalence rate of 32.4-46.11% in goats (Balamurugan *et al.*, 2014, 2011; Raghavendra *et al.*, 2008; Singh *et al.*, 2004b). The possible reasons for the lower prevalence in Assam may be due to hilly topology of the state and natural restrictions on animal movements. Overall, the present study confirms the endemicity of the PPR situation in the state of Assam and the information presented here will be useful during the implementation of the control program.

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