

## Prevalence and Risk Factor Assessment of Peste des petits ruminants in Goats in Rajshahi, Bangladesh

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### Abstract

The study was carried out to investigate the prevalence of Peste des petits ruminants (PPR) in goats in Rajshahi District of Bangladesh, and its relation to age, sex, breeds and seasonal influence. In total, 627 goats were examined where 305 were males and 322 were females. The overall prevalence of PPR in goats was found to be 20.57% (n=129). From the various risk factors analysed, age categories of goats, sex, breed and seasonal influence were found to be significantly associated ( $p < 0.01$ ) with the prevalence of PPR. Findings suggested that the seasonal influence on outbreaks of this disease was significantly higher. The clinical prevalence of PPR was highest in the month of December (31.68%) and lowest in June (9.52%). The influence of sex on PPR outbreaks was found to be higher in male (28.52%) than female (13.04%) goats. As regards to age, PPR was significantly higher in young (31.06%) compared to sucklers (13.14%) and adult (10.15%). The susceptibility of Black Bengal goats to PPR was higher than other breeds. The results of this study showed that PPR is an important goat disease in the studied areas. Thus, an appropriate control strategy has to be designed and applied, which could involve prevention of contact with infected goats and vaccination against the PPR virus.

**Keywords:** Peste des petits ruminants, goats, prevalence, risk factors

### Introduction

Goats are reared by farmers mostly as a subsidiary occupation or by poor people in Bangladesh. It is more a way of life rather than a commercial enterprise and goat herds provide substantial part of farmer's income. Goat meat and skin ranked 38% and 28% respectively, of the total meat and skin produced from livestock in Bangladesh (FAO, 1997).

Ravages caused by diseases act as one of the prime production limiting factors in goats all over the world. Effective disease management plays an integral part of goats development programme to optimize the productivity of these animals. Infectious diseases are significant impediments to the economical rearing of small ruminants (Radostits *et al.*, 2000).

Among these infectious diseases, Peste des petits ruminants (PPR) has become a much more important disease because it causes heavy economic losses. PPR is an acute and highly contagious viral disease of small ruminants particularly in sheep and goats, characterized by high fever, erosive stomatitis, mucopurulent nasal and ocular discharge, pneumonia, necrosis and ulceration

of mucous membranes and inflammation of gastrointestinal tract, leading to severe diarrhea. PPR occurs in an epizootic form, it may have dramatic consequences with morbidity of 80-90% and mortality between 50 and 80% (Lefevre and Diallo, 1990). The virus that causes PPR belongs to the morbilli virus group of the paramyxoviridae family. It is closely related to rinder pest virus which makes the PPR an important disease of small ruminants and has created tremendous problems due to its apparent similarity to rinder pest (Lefevre and Diallo, 1990).

The disease is endemic in the Arabian Peninsula (Taylor *et al.*, 1990), the Middle East and in the Indian subcontinent (Shaila *et al.*, 1996). The existence of PPR in goats has been recognized and confirmed by the World Reference Laboratory, National Reference Laboratory for PPR, Greifswald, as early as 1993 (Sil *et al.*, 1995). It was found that the isolates from Bangladesh were closely related with other strains from India, and clustered within the Asian group of PPR viruses (Barrett *et al.*, 1997). The outbreaks of PPR caused 74.13% morbidity and 54.83% mortality in Black Bengal goats in Bangladesh (Islam *et al.*,

Table-1. Prevalence of PPR in goats in different age categories

Age	Animals examined	Animals clinically affected	Prevalence (%)	<sup>2</sup> (p-value)
Adult (over one year)	197	20	10.15	
Young (4 to 12 month)	293	91	31.06**	24.639
Sucklers (1 to 3 months)	137	18	13.14	(0.00000)
Total	627	129	20.57	

\*\* Correlation is significant at the 0.01 level

2001 and Das *et al.*, 2007). Since, no studies on the prevalence of PPR in goats have been undertaken in this area, the present study was therefore carried out to investigate the prevalence of PPR in goats in Rajshahi of Bangladesh, and its relation to age, sex, breeds and seasonality.

### Materials and Methods

**Study population:** The study was conducted between March 2010 and January 2011, at the Veterinary Clinic of the University of Rajshahi, Rajshahi district, during of PPR was suspected to be after outbreak. A total of 627 goats were examined where 305 and 322 were males and females accordingly. A pre-tested questionnaire was filled during the examination, containing various types of information regarding demographic (age, sex, breed) characteristics, previous disease and preventive measures taken during examination.

**Clinical study:** The disease was diagnosed depending on the clinical history collected from owner, clinical signs and symptoms. The clinical examination of the affected animals revealed high fever (106-107°F), mild conjunctivitis, congestion of the third eye lids and mild ocular and nasal discharges. Erosive lesions were present on the inner side of the upper lip. All animals exhibited diarrhea. On the external examination, the carcass was dehydrated (sunken eyes) along with the soiling of hind quarters. Visual inspection, palpation, percussion and auscultation methods were used to examine the affected goats (Lefevre and Diallo, 1990).

**Data analysis:** All the data that were collected (age, sex, breeds and seasonality) were entered to MS excel (Microsoft office 2007, USA) and analyzed by using SPSS version 13 (Coakes *et al.*, 2006). Descriptive statistics were used to determine the prevalence of the disease and the chi-square ( $\chi^2$ ) test was utilised to examine the significance of the differences observed within the categories analyzed.

### Results and Discussion

The total goat population in the Rajshahi district is 324056 (BBS, 2002). Of the 627 goat examined, 129 were found to be clinically affected. The overall

prevalence of PPR in goats was found to be 20.57%. This observation was supported by that of Ozkul *et al.* (2002) where they found that the prevalence of PPR in goats was 20%. Conversely, the finding of this study was slightly lower than the prevalence of 32.4% reported in India while 4,407 goats sample were examined (Singh *et al.*, 2004). It is difficult to draw any conclusions because of the differences in sampling procedures in the different studies that affect their representativeness (Ozkul *et al.*, 2002).

**Prevalence of PPR based on age category:** Age of animals was analysed in three categories. The prevalence of PPR in goats with age categories adult (>1 year), young (between 4 to 12 months) and sucklers (between 1 to 3 months) was found to be 10.15%, 31.06% and 13.14%, respectively (Table 1). There was significant difference ( $p < 0.01$ ) between the age categories and the outbreaks of PPR in goats. Radostits *et al.* (2000) and Singh *et al.* (2004) also assessed that the disease is most prevalent in the goats less than one year of age. Goats in Bangladesh are typically reared as scavengers. Sometimes, mother does with small kids are kept tethered besides the house. Moreover, young goats need additional nutritional supplement for their sexual maturity and body weight gain. As a result, they are suffered from long term malnutrition which prone to disease susceptibility (Saadullah, 1991). The increased susceptibility of young goats were might be due to malnutrition, poor immunity and poor management systems.

**Association of prevalence with sexes of goats:** The association between sex and prevalence of PPR in goats was investigated (Table 2). The study revealed that the prevalence of PPR in goats was higher (28.52%) in males than females (13.04%), which is in agreement with the findings of Rahman *et al.* (2004). The results showed that the prevalence of PPR was significantly ( $p < 0.01$ ) associated with the sexes of goats. Males are apparently more prone to the disease than females may be due to genetic factors.

**Prevalence of PPR in both breeds of goats:** In the present investigation, a significant ( $p < 0.01$ ) variation in breed susceptibility was observed where the disease affected mostly (27.13%) indigenous Black Bengal

Table-2. Prevalence of PPR in goats of different sexes

Sex	Animals examined	Animals clinically affected	Prevalence (%)	<sup>2</sup> (p-value)
Male	305	87	28.52**	15.142 (0.00010)
Female	322	42	13.04	
Total	627	129	20.57	

\*\* Correlation is significant at the 0.01 level

goats. This observation was supported by that of Mondal et al., (1995), where they found that the prevalence of PPR is higher in indigenous Black Bengal (27.13%) goats than Jamunapari (11.81%) and exotic breeds (9.68%). Higher incidence of PPR in indigenous Black Bengal goats may be due to immunosuppression and irregular vaccination compared to cross breeds (Mondal *et al.*, 1995).

Association between the prevalence of PPR with seasonal influence : The seasonal variation is practically responsible for the occurrence of PPR in goats. The results of Table 3 show the seasonal prevalence of PPR in goats. The disease observed in Rajshahi was higher during the months of December (31.68%) and January (30.34%); and lowest in the months of June (9.52%) and July (11.86%). The findings concur with earlier reports by Obi (1983) and Onyekweodiri and Uzoukwu, (1992). The seasonal influence is significantly ( $p=0.00037$ ) associated with the occurrence of PPR in goats in Rajshahi. The dusty and dry winds that characterize winter season of the year has been shown to enhance the spread of PPR (Obi, 1983). Since the animals also showed relatively higher incidence of PPR during the same dry months, it is probable that the saprophytic organisms in the air passages responsible for the initiation of pneumonia became pathogenic because of the stress of PPR (Seifert, 1996 and Al-Tarazi and Daghall, 1997).

In conclusion, this study provided valuable data

on the prevalence of PPR in goats in Rajshahi District and its association with different risk factors. High prevalence of PPR in goats suggested that the level of vaccine coverage might not be enough to achieve herd immunity. We recommend pastoralist awareness to enhance participation in disease surveillance and control program for better controlling the PPR in Rajshahi.

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Table-3. Association between outbreak of PPR and seasonal influences

Month	Animals examined	Animals clinically affected	Prevalence (%)	<sup>2</sup> (p-value)
March, 2010	67	14	20.90	16.994 (0.00037)
April, 2010	57	08	14.03	
May, 2010	46	06	13.04	
June, 2010	21	02	9.52	
July, 2010	59	07	11.86	
August, 2010	42	05	11.90	
September, 2010	47	06	12.77	
October, 2010	34	05	14.71	
November, 2010	64	17	26.56	
December, 2010	101	32	31.68**	
January, 2011	89	27	30.34**	
Total	627	129	20.57	

\*\* Correlation is significant at the 0.01 level

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