

Short communication

PESTE DES PETITS RUMINANTS (PPR) VIRUS ANTIBODIES IN AFRICAN GREY DUIKER (*SYLVICAPRA GRIMMIA*)

A.O. OGUNSANMI¹, E.O. AWE⁴, T.U. OBI² AND V.O. TAIWO^{3*}

Departments of ¹Wildlife and Fisheries Management; ²Veterinary Medicine; ³Veterinary Pathology, University of Ibadan. Ibadan. Nigeria.

⁴College of Medicine, Ladoko Akintola University of Technology, Ogbomosho, Nigeria.

The prevalence rate of antibodies to peste des petits ruminants virus (PPRV) and rinderpest Virus (RPV) antigens was studied using 38 sera samples collected from African grey duiker (Sylvicapra grimmia). Of the total, 4 (10.5%) were positive for antibodies to PPRV, while none (0%) was positive for RPV. The role of wildlife in the epizootiology of peste des petits ruminants is discussed.

Key words: African grey duiker, Sheep. Goats, PPRV, RPV, Antibodies.

*Corresponding Author:

INTRODUCTION

Peste des petits ruminants (PPR) is an acute, highly contagious viral disease of sheep, goats and wild ruminants that is endemic in several countries in Africa the Arabian Peninsula, Middle East and India (Taylor, 1984; Wamwayi *et al.*, 1995; Shaila *et al.*, 1996; Govindarajan *et al.*, 1997). The virus is antigenically related to rinderpest virus which infects cattle and other large ruminants (Barrett, 1994). It is a member of the *Morbillivirus* genus, which also includes measles, canine distemper and viruses of marine mammals in the family Paramyxoviridae (Barrett *et al.*, 1993). PPR is characterized by fever, mucopurulent oculonasal discharge, diarrhoea, dehydration, ulceration of the buccal cavity and pneumonia. Gross and microscopic lesions in the natural and experimental disease have been described in domestic small ruminants (Ikede, 1983 Uzuokwu, 1983) and in wild white-tailed deer (*Odocoileus virginianus*). PPR is considered to be one of the main constraints to improving productivity of small ruminants in the regions where it is endemic (Ikede, 1983). It is of great economic importance on the basis of mortalities, morbidity, losses through body wastage, poor feed efficiency, loss of meat, milk and milk products and offspring (Nawathe, 1984).

Programs aimed at controlling PPR in ruminants have cost farmers, governments and aid agencies large sums of money throughout the last century. A comprehensive quantification of the economic importance of PPR, however, has never been attempted,

mainly due to a paucity of reliable data on such important factors as the distribution and numbers of animals at risk, insufficient knowledge of the ethics of the disease on livestock production, and the difficulty in assessing the quantification of risk factors on livestock and their products in pastoral and mixed crop/livestock subsistence production systems. Furthermore the role of wildlife in the epizootiology of PPR has not been fully elucidated. The isolation of virus from an outbreak in Indian buffalo (*Bubalus bubalis*) has been reported (Govindarajan *et al.*, 1997) to occur at a District Livestock Farm in Orathanadu, Tanjore District, Tamil Nadu where 50 of the 385 buffaloes were affected. The source of infection in the buffalo herd could not be traced since there was no reported incidence of PPR in small ruminants in the vicinity. However, the local animal husbandry department has reported confirmed outbreaks of small ruminants PPR in adjacent districts in the preceding months (Govindarajan *et al.*, 1997). The occurrence of PPR in a form that is difficult to identify clinically in buff therefore assumes epizootological significance.

Apart from vaccination using tissue culture rinderpest vaccine (TCRV), there is no PPRV vaccine in Nigeria, and there is also no specific treatment for PPR. However, several attempts have been made to alter the course of the disease through the use of antibiotics, fluid replacement therapy and antidiarrhoeal drugs (Mornet *et al.*, 1956; Wosu, 1989; Ajala *et al.*, 1997). Recently,

specific rinderpest virus (RV) and peste des petits ruminants virus monoclonal antibody based competitive enzyme-linked immunosorbent assays (cELISA) have been developed (Anderson et al, 1991). This has made it possible to rapidly differentiate infections with PPRV as distinct from those with RPV. Thus, the aim of the present study was to screen sera samples of grey duiker (*Sylvicapra grimmia*) for PPRV and RPV using cELISA technique. This is facilitated by rapidly emerging trend of increased grey duiker domestication and consumption patterns in Nigeria (Ogunsanmi et al, 2001).

MATERIALS AND METHODS

Sample collection and assay for RPV and PPRV by cELISA

Sera samples from thirty-eight (38) African grey duiker (*Sylvicapra grimmia*) were collected from Irewole Local Government Area of Osun State in the rain forest vegetation of Nigeria. Samples were examined for haemagglutinin (HI) protein of RPV and PPRV using specific RPV and PPRV monoclonal antibody-based competitive enzyme-linked immunosorbent assays (cELISA) developed by Anderson et al. (1991). Briefly, microtitre immunoplates (NUNC, Denmark) were coated with 1:100 dilutions of the RPV and PPRV antigens in PBS (PH 7.4) and incubated at 37°C for 1hr on an Orbital shaker (Luckham. Sussex, UK). The working volume was 50 µ/well.

Following three washings with PBS and drying the plates on paper towels, the sera were added to all wells except the strong positive control, moderate positive, negative control, monoclonal control and conjugate control wells. The plates were covered and incubated on shaker at 37° C for 1 hr and washed three times before the addition of 50 ml/well of rabbit anti-mouse IgG conjugate with horseradish peroxidase (Sigma Chemical Company, USA) in blocking buffer. The plates were incubated as described above. Following further washing and drying step, the chromophore/substrate i.e. orthophenylene diamine (OPD), hydrogen peroxide mixture was added and the colour reaction stopped after 10mins with 1m sulphuric acid. The optical densities (OD) were then read on a spectrophotometer (Multiscan Plus, MK 11, Flow Laboratories, UK) at 492nm.

The percentage inhibition of a given MAb (monoclonal antibody) was calculated from optical densities (OD) of the sample according to the following formula:

$$\% \text{ inhibition} = 100 \times (\text{OD of the sample} / \text{OD of the control})$$

The OD of the sample was the OD in the presence of inhibitor and OD of the control was the OD without inhibitor. An inhibition of more than 50 percent was considered positive.

RESULTS AND DISCUSSION

The results of the cELISA tests for PPRV and RPV antibodies in the sera of gray duiker and presented in Table 1. A total of 38 sera from grey duiker were examined in this study. Of the total 4 (10.5%) were positive for PPRV while none (0.0%) were positive for RPV antibodies (Table 1). The detection of antibodies against PPRV in the present study probably implicates the role of wildlife in the epizootiology of PPR in Nigeria. The results of this study also indicate PPRV may have gained access to this region through wildlife, especially wild small ruminants which are prominently hunted animals in this environment (Ogunsanmi et al., 2001).

Table 1:

Peste des Petits Ruminants Virus (PPRV) and Rinderpest Virus (RPV) antibodies in the sera of grey duiker in Irewole Local Government Area (LGA) Osun State, Nigeria

No. of samples	cELISA antibody test	Number positive	Percentage positive
38	PPRV	4	10.5
38	RPV	0	0.0

The National Livestock Project Division (NLRD) of Nigeria PPR vaccination campaign is being carried out in small ruminants in the adjoining Lagelu Local Government Area of Oyo State in the preceding months. In a follow-up study in Lagelu Local Government Area, Akpavie et al. (1997) reported that 69.4% and 85.4% of goats and sheep respectively, showed antibody to PPRV. Although RPV and PPRV are diseases of ruminants, which have the same geographical distribution in Africa, antibody to RPV was not detected in the examined grey duikers sera in this study. The reason(s) for this could not be ascertained. The results of this study suggest a need for continuous serological and clinical surveillance of PPR in wild ruminants in order to determine the prevalence of PPR, its effects on wildlife conservation and the possible role of these species in the transmission cycle of PPRV.

REFERENCES

- Ajala, O O Daneji, Al, Kumshe, H A and Oyeyemi M O (1997)** Treatment of peste des petits ruminants (PPR) in pre-weaned West African Dwarf Goat Kids. *Trop. Vet.* 1 15: 39-42.
- Akpavie, SO., Orkpeh, J.M.T., Durojaiye, O.A., Olowu, TA. and Alli, R.O. 1997):** Maternal antibody to peste des petits ruminants and rinderpest viruses in kids and lambs and antibody responses in vaccinated adult small ruminants. *Trop. Vet.* 1 5: 55-64.
- Anderson, J., Mckay, LA. and Butcher, R.N. (1991).** IAEA Technical document 623, Proceedings of a final research coordination meeting of the FAO/IAEAJSIDA/OAU Coordinated research programme. Bingerville, Cote d'Ivoire. November 19-23, 1990, pg 4.
- Barrett, E. (1994).** Rinderpest and distemper viruses. In: R.G Webster and A. Granoff(eds). *Encvci. Virol.* 3: 1260-1268.
- Barrett, T., Visser, I.KG., Mammaev, L., Van Bresseem, M.F., Osterhaus, A.D.M.E. (1993).** Dolphin and porpoise morbilliviruses are genetically distinct from phocine distemper virus. *Virology* 193: 1010-1012.
- Govindarajan, R., Koteeswaran, A., Venugopalan, A.T., Shyam, G., Shaouna, S., Shaila, M.S. and Ramachandran, S. (1997).** Isolation of pestes des petits ruminants virus from an outbreak in Indian buffalo (*Buballus bubalus*). *Vet. Rec.* 141: 573-574.
- Ikede, B.O (1983).** Hisopathology of natural cases of PPR, characteristic lesions and changes occurring during the disease peste des petits ruminants (PPR) in sheep and goats. Proceedings of the International workshop held at IITA Ibadan, Nigeria. 24-26 September. D.H. Hill (eds). ILCA, Addis Ababa. Ethiolpia.
- Mornet, P., Orue, J., Gilbert, Y. and Sow, M. (1956).** La peste des petits ruminants en Afrique occidentale francaise. Ses rapports avec la peste bovine. *Rev. Elev. Med. Vet. Pays Trop.* 9: 3 13-342.
- Nawathe, D.R. (1984).** The control of peste des petits ruminants in Nigeria. *Prev. Vet. Med.* 2: 147-155.
- Ogunsanmi, A.O., Taiwo, V.O., Iroche, P.C.N. and Sobaloju, SO. (2001).** Serological survey of salmonellosis in grey duiker (*Silvicarpa grimmia*) in Asejire, Irewole Local Government Area, Osun State, Nigeria. *Afr. J Med. Med. Sci.* 30: 115-118.
- Shaila, M.S., Shamaki, D., Morag, A.F., Diallo, A., Goatley, L., Kitching, R.P. and Barrett, T. (1996).** Geographic distribution and epidemiology of *peste des petits ruminants* viruses *Virus Res.* 43: 149-153.
- Taylor, W.P. (1984).** The distribution and epidemiology of peste des petits ruminants. *Prey. Vet. M* 2: 157-166.
- Uzoukwu. M. (1983).** The pathology of peste de petits ruminants (PPR caprine pneumoenteritis) in sheep and goats. Proceedings of the International Workshop held at IITA. Ibadan, Nigeria. 24-26 September 1980 D,H. Hill (Eds) .ILCA. Addis Ababa. Ethiopia.
- Wamwayi. H.W.. Fleming, M. and Barrett. T. (1995).** Characterization of African isolates of rinderpest virus. *Vet. Microbiol.* 41: 151-163.
- Wosu, L.O. (1989),** Management of clinical cases of peste des petis ruminants (PPR) disease in goats. *Beitr. Trop. Landw. Vet. Med.* 27 357-361.

Received: May 2002

Accepted: January 2003