

PESTE DES PETITS RUMINANTS OUTBREAK INVESTIGATION AMONG GOATS AND SHEEP IN KENEMA DISTRICT, SIERRA LEONE, MARCH 2023

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Original Article

ABSTRACT

Background

Peste des petits ruminants (PPR) is a contagious transboundary viral disease of small ruminants. The PPR virus has high morbidity and mortality, reaching 100% and over 90% in naïve herds, respectively. The disease is endemic to Sierra Leone, especially in areas where the animals are extensively reared. The present outbreak investigation describes clinical observations and laboratory confirmation of the PPR virus in goats and sheep using conventional Polymerase Chain Reaction (PCR).

Methods

Livestock keepers in the affected village reported signs of diarrhoea, pneumonia, and death among their animals to the District Livestock Officer (DLO). Clinical examination was done and samples collected from the animals. Serum samples were tested using the blocking Enzyme-Linked Immunosorbent Assay (ELISA) AU-PANVAC kit. The swabs were analyzed using Polymerase Chain Reaction (PCR) as per the manufacturer's recommendations.

Results

Clinical examination done on animals showed ulceration of the mouth, lacrimation of the eyes, purulent nasal discharge, rough coats, and diarrhea. These signs were mainly observed in goats. The sheep were not showing any visible disease signs. Eight (8) serum samples tested positive for PPR virus antibodies by the bELISA. Four (4) nasal and ocular swabs yielded an expected amplicon size of 350 bp by conventional PCR

Conclusion

Based on the clinical signs observed from our findings, PCR and serology; we therefore concluded that the pathogen that caused the current outbreak in Kenema District is PPRV.

Recommendations

More efforts be made to control this disease in the country through vaccination of the animals. Livestock farmers should implement good husbandry practice and biosecurity on their farms.

Keywords: PPRV, PCR, Outbreak, Investigation, Small ruminant, confirmation, Kenema

BACKGROUND

Peste des petits ruminants (PPR) is a contagious transboundary viral disease of small ruminants (goats and sheep) (Ahaduzzaman, 2020; Kumar et al., 2014, 2017). It is one of the economically important viral diseases affecting small ruminants and is widely distributed across Sub-Saharan Africa, the Middle East, Arabian Peninsula, and the Indian subcontinent (Britton et al., 2019; Jones et al., 2016; Kumar et al., 2014). The PPR virus has high morbidity and mortality, reaching 100% and over 90% in naïve herds, respectively (Kumar et al., 2017). This might lower the flock's production and population, which would have a detrimental impact on food security and the lives of rural women and young people who constitute the majority of the nation's sheep and goat keepers.

PPR is endemic to Sierra Leone (Munir et al., 2012), especially in areas where the animals are extensively reared. The disease is poorly understood among farmers in most parts of the country as most conditions are diagnosed based on related clinical signs and frequent death of animals (Conteh et al., 2020; Mustapha et al., 2022).

PPR outbreaks are common among goats and sheep in Sierra Leone (Munir et al., 2012; Mustapha et al., 2022). Prophylactic vaccination, on-farm biosecurity and good management practices play key role in curtailing severity of disease during outbreaks.

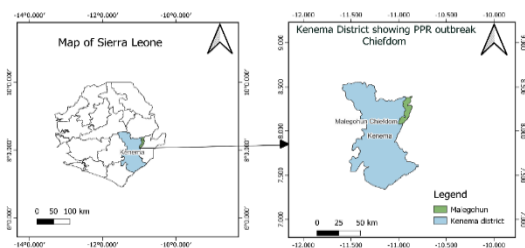
The present outbreak investigation describes clinical observations and laboratory confirmation of PPR virus in goats and sheep using conventional PCR. The outbreak occurred

in sheep and goats reared semi-intensive and extensively in Benduma village, Kenema district in the Eastern region of Sierra Leone.

METHODS

Description of outbreak

Livestock keepers in Benduma village, (Latitude 8.232408° and Longitude -10.890252°), Malegohun Chiefdom, in Kenema district reported signs of diarrhoea, pneumonia and death among small ruminants (Figure 1) on 2nd March 2023.



The District Livestock Officer (DLO) was notified about the cluster of deaths of sheep and goats upon which he went to confirm the report on the 3rd March 2023. Upon verification he informed the Director of Livestock and Veterinary Services Division about the sudden death of these animals in the village. A joint team from Central Veterinary Laboratory (CVL), Epidemiology Unit of the Ministry of Agriculture and Food Security and Sierra Leone Agriculture Research Institute was dispatched to the outbreak village on 6th March 2023. The team found out that the animals in the village were not vaccinated against PPR and no treatment had been administered. Animal data was collected using animal diseases case investigation forms that have demographic information about the flock, age, sex. Both sick and apparently healthy animals in the village were clinically examined and blood, ocular and nasal swab samples collected.



2a. Watery diarrhoea

2b. crust on the lips

Figure 2: Clinical Investigation in Affected Goats

The clinical signs observed mainly among the goats ocular and nasal discharges, crust on the lips, and diarrhoea (Figure 2)

Sample collection

Blood samples (5 ml) was collected from thirteen animals (12 goat & 1, sheep). Samples were collected from both clinically sick and apparently healthy animals. Nasal and ocular swabs were collected from clinically sick animals. The swabs were placed in sterile tubes containing 2.5 ml of virus transport medium. Serum was harvested the following day and together with the swabs, triple packaged and transported to the CVL Teko under cold chain.

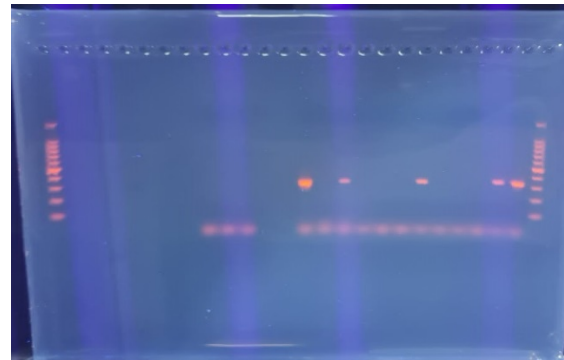
Laboratory analysis

Serum samples were tested using the blocking Enzyme-Linked Immunosorbent Assay (ELISA) AU-PANVAC kit. The swab were analyzed using Polymerase Chain Reaction (PCR) as per the protocol of Couacy-Hymann et al., (2002). For both procedures, internal quality control measures were appropriately applied to validate the testing results

RESULTS

Clinical examination done on animals showed ulceration of the mouth, lacrimation of the eyes, purulent nasal discharge, rough coats, and diarrhea. These signs were mainly observed in goats. Sheep were not showing any visible disease signs. Eight (8) serum samples were tested positive for PPR virus antibodies by the bELISA. Four (4) nasal and ocular swabs yielded

expected amplicon size of 350 bp by conventional PCR (Figure 1).



DISCUSSION

Pest des petits ruminants is one of the serious viral transboundary animal diseases of small ruminants. Several countries frequently report PPR outbreak in goats and sheep. Although clinical findings may lead to indicative diagnosis of the disease among small ruminants in endemic areas, however, laboratory confirmation is key for confirmation of the PPR infection.

In the present investigation, PPR outbreak was suspected in goats and sheep in Kenema District based on clinical findings. This was later confirmed at the central veterinary laboratory using serology and molecular diagnostic methods. Although PPR outbreaks have been reported in some parts of Sierra Leone and serological evidence reported in many parts of the country including Kenema District, laboratory confirmation of presence of virus is rarely done. Diagnostic approaches using serological and molecular techniques are routine for outbreak investigation for many animal disease conditions (Ali et al., 2014; El-Yuguda et al., 2009; Karbasanavar et al., 2018; Zahur et al., 2009).

An interesting finding in this report is that only goats were showing signs of the disease and dying of the disease. Our finding is similar to the report by Khan et al., (2008). No sheep in the village presented any clinical sign or death during the outbreak, the only sheep sampled was positive of PPR antibodies. Ahmad et al., (2005) reported similar observation in which sheep grazing with PPR infected goats to be PPR seropositive and not presenting with the disease.

The swabs (nasal and ocular) from the sick goats were positive of PPR virus using conventional PCR. This was in line with other authors (Ali et al., 2014; Karbasanavar et al., 2018).

CONCLUSION AND RECOMMENDATION

Based on the clinical signs observed from our findings, PCR and serology; we therefore concluded that the pathogen that caused the current outbreak in Kenema District is PPRV.

It is suggested that more efforts be made to control this disease in the country at large through vaccination of the animals. Livestock farmers should implement good husbandry practice and biosecurity on their farms.

The control of PPR disease will ensure sustainable food security and alleviate poverty in the country, especially in the disease affected rural communities where women and youths bear the greatest shock of animal lost to the disease.

Ethical statement

No ethical approval was required.

Author contributions

EIM, AFS, : conceptualization. EIM, MHL, GPN: methodology. EIM, AFS, AL: writing and review. All authors contributed to the article and approved the submitted version.

Competing interests

The authors declare that they have no competing interests. All authors have read and approved the final version of this manuscript.

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