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Incidence of Goat pox in stall-fed goats: A report of disease investigation in a goat farm with floating population in Dindigul district of Tamil Nadu

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Abstract

Goat pox virus infection is common and reported often in the recent past in various regions of Tamil Nadu. This study reports the occurrence of goat pox in a stall-fed goat fattening unit which harbors a floating population of bucks being restocked in timely intervals based on movement of fattened bucks to the retail unit owned by the same owner 30 kms apart. The disease investigation started after the onset of clinical symptoms was reported by the farm owner. The scab samples from the affected animals were subjected to polymerase chain reaction (PCR) targeting the P32 gene - Goat pox virus attachment protein gene. 17 animals were reported to show clinical signs including anorexia, pyrexia, bilateral nasal and ocular discharge, with four animals in this morbid group showing pock lesions in the periocular regions, perineum and under the tail region. The morbidity was 22% with no mortality. Diagnosis by molecular confirmation based on p32 gene was positive for all four samples. Lack of proper vaccination strategy and negligence in adapting farm biosecurity measures has led to the disease incidence in a farm holding animals in constant movement between fattening and retail spaces.

Keywords: Goatpox virus infection, pock lesions, P32, uncontrolled animal movement, quarantine

Introduction

Pox viral infections which are considered as the main constraint in augmenting productivity in sheep and goats reared in tropical countries are caused by a group of viruses belonging to the genus *Capripoxvirus* (CaPV) categorised under *Chordopoxvirinae* subfamily of *Poxviridae* family^[1]. This genus includes three species namely sheepox virus (SPPV), goatpox virus (GTPV) and lumpy skin disease virus (LSDV) which causes diseases in sheep, goat or cattle, respectively. The contagious and infectious nature of CaPV causes transboundary spreads^[2] and were categorized earlier under notifiable by the World Organization for Animal Health (OIE, 2008). The disease is endemic in African continent and middle eastern countries which are located north of equator comprising of Turkey, Iran, Iraq and Afghanistan^[2]. Goatpox is reported from almost all the regions of India including the northeastern Himalayan ranges^[3, 4, 5]. Aerosol and vector borne transmission is the main source of infection and spread of GTPV^[6]. In Tamilnadu, GTPV is endemic and reported in both sheep and goats, with incidences being reported in the north eastern and southern parts of the state with very few or no reports from the central or western districts^[7-11].

Materials and Methods

Disease investigation: The disease investigation was undertaken in a stall fed goat retail unit located in Mambarai village of Dindigul district in TamilNadu. The stall comprised of 76 Kodi aadu breed goats of age between 4 months to 7 months with average live weight of 18 kgs/ goat.

History: The retail stall at Mambarai is operating 30 kms away from the fattening unit located at Seerangagoundenpudur, which engages a floating population of goats. The bucks which are fattened at the fattening unit are transported to the stall on regular basis.

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Due to continuous demand in the retail stall regular purchase of bucks was being done by the owner without proper quarantine practices at the fattening unit. Vaccination history included only vaccination against PPR with purchases being made from all over the districts of Tamil Nadu and from Andhra Pradesh. The investigation was made after the farmer reported signs of rhinitis and anorexia in 17 bucks including pock like lesions in 4 recently purchased animals without any vaccination history. The farm posed 22% morbidity and no mortality as on the date of investigation.

Sample collection: Ailing animals with clinical signs were examined along with other healthy peers from the herd. Scabs from 4 infected animals with pathognomonic pock lesions were collected in 10% glycerol saline which were subjected to Polymerase Chain Reaction (PCR).

Identification of GTPV specific gene and confirmation:

The scab materials were subjected to DNA isolation using Genomic DNA extraction kit: QiAmp® DNA Mini Kit (M/s Qiagen Sciences, Maryland, USA) following manufacturer's instructional protocol. The extracted DNA samples were stored at -20°C. The PCR amplification of 4 DNA samples targeting truncated p32 gene were done with 50 µL reaction mixture containing 10 µL of 5X PCR buffer, 8 µL MgCl₂ (25mM), 1 µL dNTPs (10mM), 2 µL each of forward and reverse primers (10 pmol/ µL), 1 µL of template DNA, 1 µL of *Pfu* DNA polymerase (5U/ µL), and 25 µL OF nuclease

free water. The forward and reverse primers (5'-3') (12) used are as follows: Forward primer - TCCGAGCTCTTTCCTGATTTTCTTACTAT
Reverse primer - TATGGTACCTAAATTATATACGTAAATAAC

The reaction was run with the cycling conditions: Initial denaturation at 95 °C for 5 min, cycle denaturation at 95 °C for 45 sec, annealing at 50 °C for 50 sec, cycle extension at 72 °C for 1 min and final extension at 72 °C for 10 min for 35 cycles in Master cycler gradient (M/s Eppendorf AG, Hamburg, Germany). The PCR products were clarified in 1% agarose gel using Horizontal electrophoresis apparatus and visualized in a transilluminator and the results were documented.

Results

A tentative diagnosis of GTPV infection was made based on the clinical signs and symptoms including fever, anorexia, rhinitis and bilateral conjunctivitis observed in 17 goats. Four recently purchased goats among the diseased group exhibited pox specific lesions: papules in the perineal region, under the tail, periorbital and pericocular regions. Ulcerated papules with scabs found in these bucks led to the preliminary diagnosis of CaPV in the flock. Confirmatory diagnosis of GTPV was based on the PCR amplification of the P32 gene which yielded 192 bp products in all the 4 DNA samples included in the test (Fig 1).

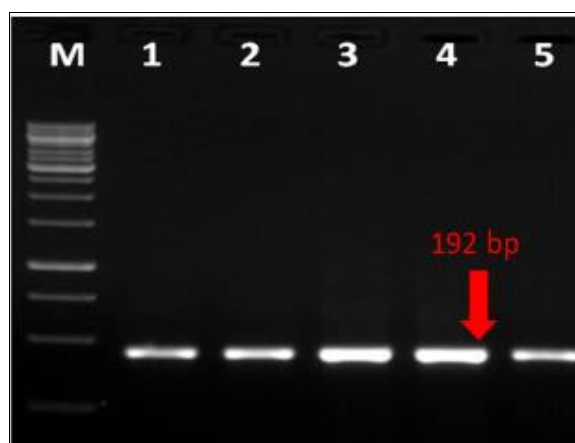


Fig 1: Amplification of truncated P32 gene. M – Marker, lane 1 – Positive control, Lane 2,3,4,5 – test samples

Discussion

Pox viral infections are endemic throughout India. Incidences are reported from all over TamilNadu causing economic losses. This disease investigation conducted in a stall fed goat retail unit emphasizes the importance of diagnosis in the early stages and to curtail further spread. The clinical symptoms observed include anorexia, pyrexia, papular eruptions and bilateral mucous discharge from the nostrils (3). Confirmation of GTPV was done using PCR targeting the attachment gene P32. All four samples were found positive indicating a clear picture of disease incidence in the farm.

Though aerosol and vector borne transmission is possible, in this study, the mode of spread can be attributed to close confinement of the diseased animals with other healthy counterparts for a brief period of time at the fattening unit before being transported to the retail unit. The contagious and infectious nature of pox virus jeopardized the rapid spread to the other 13 morbid animals in the farm. Despite manifesting 0% mortality, this GTPV infection alarms the diagnostic

intervention at early stages as it caused 22% morbidity, which has economical impact in a fattening unit. Age, breed and climatic conditions influence the disease occurrence but the farm holding animals of fairly uniform age of 4 to 6 months also witnessed the infection. Poor or no vaccination history of the newly purchased or constantly floating population of bucks inside the farm might be one of the reasons behind this disease incidence. As the bucks are purchased at young ages from various parts of the state or district or outside the state, there is always possibility of bringing a carrier animal/ animal harbouring the infection in incubation stage into the healthy flock. Lack of quarantine along with no isolation of healthy animals after the onset of clinical symptoms had led to the rapid inflation of morbidity rate upto 22%.

Dindigul district in Tamil Nadu is witnessing a rapid expansion in the number of small ruminant fattening units due to increased number of farmers undertaking this farming enterprise driven by high demand for chevon. This unprecedented demand driven market has made many

inexperienced farmers to undertake this farming activity without prior farm managerial skills including disease prevention by vaccination and implementation of biosecurity measures like quarantine and isolation to avoid disease spread into a healthy farm. This aspect of management attracts more attention in places like Dindigul having numerous farms in close proximity leads to recurrent disease incidences and rapid spread between the farms. The floating population of the farms also contributes to the severity of the disease spread resulting in ineffective control after the disease incidence. Up taking strict annual vaccination plans along with adoption of strict farm biosecurity measures will nullify the disease incidences in fattening units holding animals which are constantly in movement between farms and markets and also between farms.

Conclusion

The study confirms the presence of Goat pox disease virus in the farm based on clinical signs, lesions and molecular confirmation by PCR. Lack of vaccination and poor biosecurity measures adopted in the farm has led to the incidence and rapid spread of the GTPV in the farm. Early diagnosis will aid in laying out a proper vaccination strategy which is region specific and helps in averting further spread between the units. Adoption of biosecurity measures will significantly reduce the morbidity rates and hence the economic losses will be avoided.

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