Occurrence of Parapox Virus in a 3-year-old Cow and the Resulting Lesions in a Milking Calf

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ABSTRACT

Parapox virus, causes *Pseudocowpox* in dairy cows, a mild infection of the udder and teats. *Pseudo cowpox* virus (PCPV) wPseudocowpoxas identified in a 3-year-old dairy cow with papule lesions on the surface of the teat and udder. Diagnostic specimens (oral swabs from the adult cow and calf from a dairy farm in Tiruvannamalai) were collected, and the poxvirus DNA was obtained from the teat lesion material. It was confirmed as *Pseudocowpox* virus by a PCR test, which produced 594 bp of amplicon. The results revealed that cattle were infected with PPV.

Keywords: Parapox, Bovine, Calf, PCR

INTRODUCTION

The causative agent of *Pseudo cowpox* is a member of the genus Parapox virus, which has close similarity to the viruses of infectious stomatitis and contagious ecthyma (Radostits *et al.*, 2007). Freshly calved and recently introduced cattle into the farm are most susceptible, but all adult cattle are likely to be affected. The disease does not appear in animals less than 2 years of age, unless they have calved. *Pseudo cowpox* is relatively benign, occurring as a result of difficulty in milking and an increase in the incidence of mastitis (Radostits *et al.*, 2007). Lesions and clinical signs of Parapoxvirus infections normally begin as small, red papules on the teats and are followed rapidly by scabbing or by the formation of small vesicles in the udder tissues. Infection is self-limiting and normally resolves in about 2 weeks; however, some lesions may persist for several months, giving the affected teats a rough and corrugated feel, and more scabs may form. The infection spreads slowly throughout milking herds, and a variable percentage of dairy animals, especially milking animals, show lesions at any one time. Dairy cattle may become re-infected in subsequent lactations. Infection of PCPV is mostly associated with the udder and teats (De Sant'Ana *et al.,* 2013). Infection of oral tissues in calves has not been reported. This report describes a PCPV in the milking cattle and labial tissues of milking calves.

MATERIALS AND METHODS

A cow with a history of teat lesions was examined in a village of Tiruvannamalai District. Examination revealed that lesions were limited only to the teats and circular in shape. All four teats were wounded and there were no wounds on the body of the udder. After examination and suspecting to *Pseudo cowpox*, the labial region of the milking calf was examined to evaluate the probability of the disease and small papules were observed in and around the mouth. The papules appeared on the mouth of the calf after a week of frequent sucking of the infected udder. The papular samples were collected aseptically with 50% glycerol saline from the teats' lesions of the affected animal and transported and processed at the Central University Laboratory, TANUVAS, Chennai-51. DNA was extracted from the skin scabs using Genei Ultrapure TM Mammalian Genomic DNA Purification Kit – Tissues (Bangalore GeNei Pvt.

Ltd., India) according to the manufacturer's instructions. Reaction volumes for the PCR of 50 µl were used and contained 5 µl of 10× buffer with 15 mM MgCl2, 10 mM of each dNTPs, 100 pmol of each oli-gonucleotide primer, 100 ng of DNA sample, and 3U Taq DNA polymerase.

RESULTS AND DISCUSSION

Evidence of Parapox virus DNA was obtained from a lesion of the teat and an oral swab collected from the affected adult cow and calf of a dairy farm (Figures 1 and 2). No evidence of prior or current orthopoxvirus infection was detected in other animals examined. Viral DNA extracted from the infected tissue cultures was examined by pan-parapoxvirus reported primers. As shown in Figure.2, a 594 bp product, at the expected size, was amplified from the total DNA extract of lesion cells of the teat and oral swabs of cattle and suckling calf. *Pseudo cowpox* virus infection is reported worldwide and mostly affects milking cows (Roess *et al.*, 2013). The virus is usually transmitted to herds through infected animals and disseminates slowly to other animals. Within herds, transmission occurs by direct and indirect contact. Indirect routes include calf suckling of multiple cows, flies, milking equipment, and inadequate milking/management procedures (Almagro *et al.,* 1991). Most PCPV infections are associated with skin infections on the teats, udder, and foot in cattle, camels, reindeer and cats (Abubakr *et al*., 2007) or skin infections of human hands (Falk *et al.,* 1978).

In addition to the suckling calves, adults also show severe exanthematous skin lesions in the facial and teat regions. Unlike capripoxviruses (sheep pox and goat pox), which are endemic in Tamil Nadu, parapoxviruses could be transmitted to humans (Kitching *et al.,* 1987). Both the affected milking animal and calf were given utmost care in terms of the usage of antibiotics and supportive therapy to avoid secondary bacterial infection. As stated in reports like Falk *et al.* (1978), parapox virus is seldom fatal, and the infected animals normally recover within a month, but mortality among the ailing animals can be expected, especially in calves if they are not attended to in time to prevent secondary bacterial infections or myiasis. Specific care must be taken by the people attending to the wounds of the affected animals, especially to the forearms, hands and fingers, as these are the common sites of parapoxvirus infections in humans (Robinson *et al*., 1983).

CONCLUSION

Serious clinical occurrence of parapoxvirus infections in dairy animals have been increasingly reported across the world. Understanding the range and diversity of different species and strains of parapoxvirus will help to identify any unusual patterns of the disease occurrence. Further studies are required on gene sequencing and phylogenetic analysis for development of vaccine and prediction of the disease occurrence and to determine the prevalence of infections and to identify infection risks in both animals and humans.

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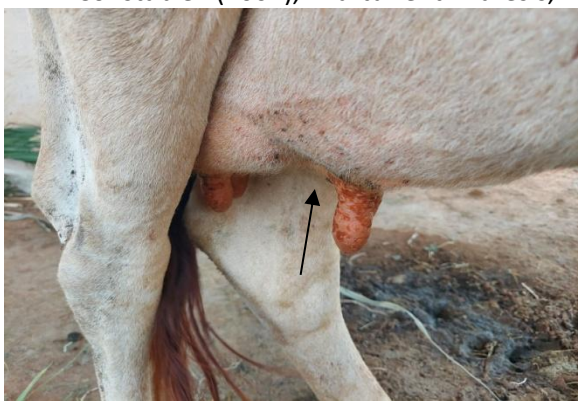

Figure 1: Udder and teats with papular lesions

Figure 2: Calves with papular lesions around mouth/labial region

Figure 3: Parapox specific pcr -Agarose gel image of Parapox specific PCR; Lanes 1 and 2 - Positive amplification for Parapox virus (594 bp); Lane 4-100 bp marker

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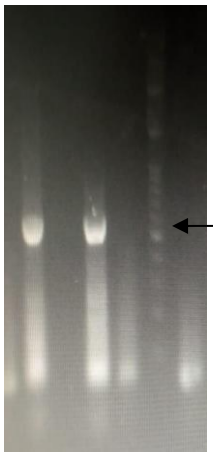

Parapox virus (594 bp)