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Efficacy of Ethno Veterinary Medicine in the Treatment and Control of Sheep Pox Outbreak in an Organized Sheep Farm

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Abstract

This study aimed to investigate the outbreak of sheep pox in an organized sheep farm in the Hosur District of Tamil Nadu and to assess the efficacy of Ethno Veterinary Medicine in the treatment and control of the disease during July 2021 and November 2021. Out of 376 animals, 93 were affected (24.73 %) and 72 died (Mortality 77.41 %) during the first investigation. Based

on history, clinical examination and necropsy findings clinically the flock was diagnosed to have sheep pox and PCR testing helped to confirm the diagnosis. Along with the symptomatic and supportive therapy, Ethno Veterinary Medication was followed for the affected animals. On the second investigation of the herd, out of 138 animals, 55 animals recovered from the previous sheep pox infection without any mortality. Along with the symptomatic line of treatment, Ethno-Veterinary medicine helped in the speedy recovery of ailing animals and the reduction of mortality percentage.

Key words : Ethno-Veterinary medicine, Sheep pox, PCR

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Sheep pox is a highly contagious and economically important disease of sheep caused by the virus of genus Capripox virus (CaPV) (Fauquet *et al.*, 2005). Though the Sheep pox virus (SPPV) primarily affects sheep, and the Goat pox virus (GTPV) mainly affects goats, some isolates can cause mild to serious disease in both species (Spickler Anna Rovid, 2017). In India as well as globally sheep pox is a disease of most economic importance causing heavy economic losses due to mortality, abortions and loss of market value of the affected animals (Senthilkumar *et al.*, 2006). The morbidity and mortality rates can approach 100% in some flocks (Spickler Anna Rovid, 2017).

Materials and Methods

A clinical disease investigation was carried out in an organized sheep farm in Hosur District of Tamil Nadu State, India with a total number of 376 Mecheri sheep breeds aged between 3 months to 4.5 years during the months of July (n=238) and November (n=138) 2021. Out of 376 animals, 93 were affected with sheep pox (24.73 %) and 72 died (mortality 77.41 %). The flock was dewormed regularly and vaccinated against PPR and Enterotoxaemia. All the animals were reared in the semi-intensive system where animals are fed with concentrates and allowed

for grazing. In that flock, no previous history of sheep pox was reported.

The affected sheep were reported to have fever, respiratory distress, facial swelling, weakness, emaciation, recumbency and death. The affected animals were examined in detail, samples were collected from 7 animals and necropsy was carried out on 7 animals. On clinical examination the affected animals were dull and depressed, disinclined to move, with pyrexia and congested mucus membranes. Bilateral mucopurulent nasal discharge with crusts obstructing the nares (Fig. 1), bilateral epiphora, blepharitis and blepharospasm, tracheal rales and increased breath sounds were observed. Macules, papules and nodular lesions were noticed under the tail (Fig. 2), ears and face scabs were noticed in the axilla, inguinal region (Fig. 3), and perineum. Ulcers were noticed in the mucocutaneous junctions and lips. Blood and serum samples were collected from 7 sheep for laboratory investigations following standard operating procedures (Radostits *et al.*, 2007). Faecal samples, feed materials, nasal swabs, scabs from affected animals and visceral organ samples from dead animals were also collected for Polymerase chain reaction (PCR). The polymerase chain reaction was performed as per the standard operating procedure (Gunther *et al.*, 2017).

Table I. Hematology and biochemistry profile of sheep with Sheep pox (n=7) and after recovery (n=7)

Parameters	Before Treatment	After treatment	P value
Hb (g/dL)	12.9±0.53	8.9±0.47	0.000
PCV (%)	37.57±1.70	35.44±1.91	0.310*
RBC (x 10 ⁶ /µl)	6.2±0.32	9.96±1.01	0.012
Total protein (g/dL)	8.14±0.27	6.95±0.34	0.018
Albumin (g/dL)	3.19±0.16	4.0±0.39	0.058*
ALT (U/L)	23.62±4.5	94.71±18.9	0.005
BUN (mg/dL)	50.4±18.52	28.14±1.90	0.280*
Creatinine (mg/dL)	1.05±0.28	0.70±0.06	0.300*
Calcium (mg/dL)	9.87±0.39	10±0.22	0.790*
Phosphorous (mg/dL)	12.17±5.22	6.01±0.20	0.280*
Glucose (mg/dL)	32.2±6.46	53.85±8.14	0.028
Potassium (mEq/L)	4.73±0.28	5.02±0.177	0.210*

The values are presented Mean ± Standard Error. Hb – Hemoglobin, PCV – Packed Cell Volume, Red Blood Cell count, BUN – Blood Urea Nitrogen, ALT – Alkaline Phosphatase, * Significant at p > 0.05.

Line of Treatment

Symptomatic and supportive therapy was done for ailing animals with Inj. Ceftiofur @ 1 mg/kg B.wt IV, Inj. Flunixin meglumine @ 1 mg/kg B.wt IV, Inj. Furosemide @ 2 mg / kg B.wt IV and Inj. B Complex with Liver extract – 2ml IM for five days. Inhalation therapy was given with Tincture Benzoin in hot water. Crust present in the nares and oral cavity was cleaned with weak potassium permanganate solution (1:10000) and a paste of turmeric with neem was applied over the lesion.

Ethno Veterinary Medication

Recently there is an increased awareness of the use of Ethno Veterinary Medicine (EVM) in the treatment and control of various diseases in farm animals. EVM are less prone to drug resistance and have much fewer damaging side effects than conventional allopathic medications (Babalobi Olutayo and Olurounbi Deborah, 2022).

Along with the above line of treatment, the owner was advised to follow the Ethno-Veterinary Medication. Oral medication was done with Cumin (*Cuminumcyminum*), Fenugreek (*Trigonella foneum-graecum*), Pepper (*Pipernigrum*), Turmeric (*Curcumalonga*), Tulsi (*Ocimumtenuiflorum*), Kuppameni (*Acalypha indica*), Veppankolunthu (*Azadirachta indica*), Thirneetrupachilai (*OcimumBasilicum*) and Nilavembu (*Andrographispaniculata*). They were powdered, mixed with country sugar and grounded to make it as a paste given to affected animal as 10 grams per animal two times a day and in severely affected animals, additionally scrapped coconut been added and given for three times a day. Externally the affected animals were treated with oil made from grounded Garlic (*Allium sativum*), Kuppaimeni (*Acalypha indica*), Tulsi (*Ocimumtenuiflorum*), Maruthani (*Lawsoniainermis*), Veppakolunthu (*Azadirachta indica*) and added to sesame oil (1:10). After boiling and cooling, this oil was applied over the lesions.

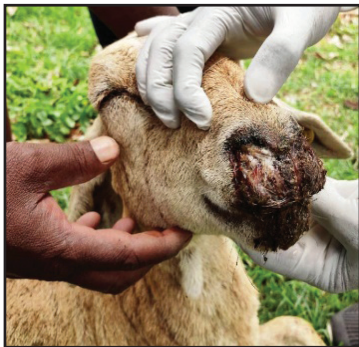


Fig. 1. Bilateral mucopurulent nasal discharge with crusts obstructing the nares



Fig. 2. Nodules on the ventral part of the tail



Fig. 3. Scabs around the inguinal area



Fig. 4. Nodules in the lungs



Fig. 5. Diffuse necrosis in the kidney

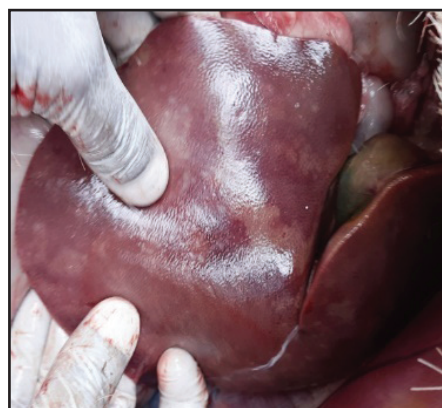


Fig. 6. Diffuse necrosis in the liver

Results and Discussion

Out of 376 animals, 93 were affected (24.73 %) and 72 died (Mortality 77.41 %) during the first investigation. The hematology and serum biochemistry showed a statistically significant difference in PCV, Albumin, BUN, Creatinine, Calcium, phosphorus and Potassium indicating renal dysfunction (Table I). The eggs of *Strongyle spp* could be detected on faecal examination. Antibiotic sensitivity test of nasal swabs showed sensitivity to Gentamicin, Ceftriaxone and Ciprofloxacin. A toxicological examination of feed material revealed the presence of Aflatoxin 9 ppb and didn't contain any other mycotoxins. The presence of Aflatoxin was well below the maximum permissible level of 20ppb set by BIS.

On necropsy, the dead animals had oral ulcers, serous and mucopurulent discharge in the trachea, nodules in the lungs (Fig. 4) and abomasum and diffuse necrosis in the kidneys (Fig. 5) and liver (Fig. 6). This was in agreement with previous studies by Oreiby *et al.*, (2022) who reported that postmortem examination of sheep pox affected animals had marked congestion of all visceral organs and notable pulmonary lesions. Lung was the only organ affected in sheep pox and there were multiple nodules distributed throughout lung lobes, and this finding was considered as a consistent necropsy finding in all dead lambs (Chanie, 2011). Previous studies report that sheep pox diagnosis usually based on PCR-based diagnostic methods was effective in the diagnosis of goat pox and sheep pox in suspected biopsy samples in the field (Rao and Bandyopadhyay, 2000). Whole blood

samples from ailing animals, scabs and visceral organ samples from dead animals are positive for Sheep pox identified by PCR amplification of sheep pox DNA at 302 bp (Fig. 7). Based on the clinical signs, necropsy findings and PCR the disease was confirmatorily diagnosed as Sheep pox.

As there is no specific treatment for sheep pox, symptomatic and supportive treatment may reduce morbidity and mortality (Spickler Anna Rovid, 2017). Emergency vaccination might be an effective strategy to overcome this disease and the control of sheep pox depends mainly on biosecurity practices (Oreiby *et al.*, 2022). In our visit to the herd, vaccination against sheep pox virus was done to the remaining animals and advised to disinfect the shed and farm premises

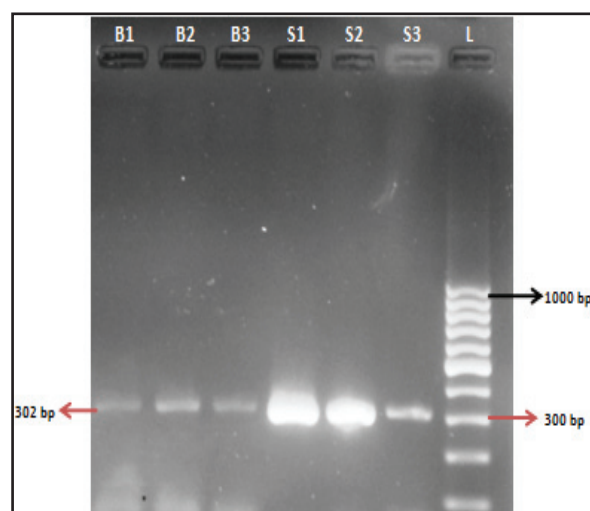


Fig. 7. PCR amplification of Sheep pox DNA at 302 bp (Lane: B1 to B3 – Blood samples; S1 to S3 – Scab samples; L- 100 bp to 1000 bp ladder).

with sodium hypochlorite (2-3%) at 7- 10 days intervals regularly.

During the first visit to the herd, out of 238 animals 93 animals were affected and 72 animals died in the past 3 weeks (Mortality 77.41 %). All age groups can be affected by sheep pox, however, mortality may be up to 50% in a fully susceptible flock and as high as 100% in young animals (Bhanuprakash *et al.*, 2005). Mortality rate of 22.19 percent during the year 2001-02. In this present report mortality of 77.4% was recorded in sheep of all age groups which indicates the high virulence of the virus (Senthilkumar *et al.*, 2006). On the second visit to the herd, out of 138 animals, 55 animals recovered from the previous sheep pox infection without any mortality.

Summary

An organized Sheep farm with 376 sheep aged between 3 months to 4.5 years affected with sheep pox with mortality of 77.41% was diagnosed by clinical examination, necropsy findings and confirmed by PCR testing. Along with the symptomatic line of treatment, Ethnoveterinary Medicine helped in the speedy recovery of ailing animals and the reduction of mortality percentage.

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