Management of Foot Rot in Lambs

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Abstract
A total of 155 cases of lambs with lameness were presented for treatment from January, 2009 to July, 2009 at an organized sheep farm. The affected lambs were segregated into four groups and different treatment regimens were assessed. Animals of group 1 were treated by hoof trimming and foot bath. Those of group II were administered Streptopenicillin, along with hoof trimming. For group III, hoof trimming, foot bath and Streptopenicillin were administered, while the animals of group IV were treated with a combination of hoof trimming, foot bath, Streptopenicillin and topical oxytetracycline. Significant difference (p<0.01) existed between treatments I, II and treatments III and IV. Among the treatments, it was found that animals of groups III and IV responded better (80.0 and 94.3 percent, respectively). The salient features of foot rot and different management options available for treatment and control of this condition are discussed.

Introduction
Foot rot (necrotic pododermatitis), is a contagious disease of cattle, sheep and pigs. Ovine foot rot is caused by *Dichelobacter nodosus* (formerly *Bacteroides nodosus*) a Gram negative anaerobe, in conjunction with *Fusobacterium necrophorum* (formerly *Sphaerophorus necrophorus*). *Fusobacterium necrophorum* is a normal inhabitant of the ruminant digestive tract and in wet weather may facilitate *D. nodosus*, a resident of ovine hooves causing foot rot. The disease results in inflammation of the sensitive laminae and necrosis and ulceration of the interdigital space, coronary bands and posterior hooves, leading to lameness. The disease can be a cause of decreased production, as the affected animals are not able to graze to their fullest potential. The condition may precipitate further complications necessitating culling of the affected animal. Thus, effective treatment and management procedures are to be followed to prevent the onset of this condition as well as treat affected animals. This paper describes an outbreak of foot rot among lambs in an organized sheep farm and outlines the methods followed to treat and control the disease.

Materials and Methods
The study was conducted at the Sheep Breeding Research Station, TANUVAS, Sandyannah, The Nilgiris, Tamil Nadu, India during January, 2009 to July, 2009. The farm is located at an elevation of 2236 M from MSL. The topography constitutes of undulating hills with temperature ranging from 0-24° C. The annual rainfall ranges from 840 to 3000 mm with most of the rainfall being received during South west monsoon (June and August).

A total of 155 lambs of less than one year of age were presented with lameness for treatment during the study period. Based on careful examination, the following clinical signs and lesions viz., lameness, moist and reddened toes, separation of the horny tissues, characteristic foul odor, corns, foot scald, foot abscesses, injuries and objects wedged between the toes were observed. Impression smears were prepared from the lesion exudates for Gram’s staining for microscopical examination as per Barrow and Feltham (1993) [Fig.1].

Each case (140 cases) when tentatively identified as suffering from foot rot was randomly allotted in turn to the following four treatment groups of 35 animals each.

Treatment I. Foot trimming + Foot bath
Disinfected foot trimming was used for trimming the overgrown hoof. The affected tissues were
Foot Rot in Lambs

cleaned and overgrown portions of hoof were trimmed away. Foot bath with 10% formalin was used to dip the infected hoof.

**Treatment II. Foot trimming + Antibiotics**
Along with foot trimming Streptopenicillin @ 20 mg/kg was given parenterally for five days.

**Treatment III. Foot trimming + Foot bath + Antibiotics**
Streptopenicillin @ 20 mg / kg was given parenterally for five days continuously along with foot trimming and foot bath.

**Treatment IV. Foot trimming + Foot bath + Antibiotics + Topical medications**
Along with foot trimming, foot bath and Streptopenicillin, oxytetracycline (5%) solution was used as topical medication.

The recovery from the condition was monitored and animals that showed normal gait as well as complete healing of the affected foot within a week were considered as recovered animals. The differences in the rate of recovery among the treatment groups were statistically analyzed by least square procedure (Harvey, 1990).

Fig. 1: Showing separation horny tissues and necrosis with pro-discharge in the interdigital space.

Fig. 2: Straight and curved rods of *D. nodosus* showing characteristic swellings at one or both ends.

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Lambs affected/ No. present</th>
<th>Rainfall (mm)</th>
<th>% of incidence</th>
<th>Number of rainy days</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>4/195</td>
<td>-</td>
<td>2.05</td>
<td>-</td>
</tr>
<tr>
<td>February</td>
<td>11/167</td>
<td>-</td>
<td>6.58</td>
<td>-</td>
</tr>
<tr>
<td>March</td>
<td>11/286</td>
<td>76.8</td>
<td>3.84</td>
<td>5</td>
</tr>
<tr>
<td>April</td>
<td>22/424</td>
<td>28.0</td>
<td>5.18</td>
<td>2</td>
</tr>
<tr>
<td>May</td>
<td>35/421</td>
<td>179.8</td>
<td>8.31</td>
<td>9</td>
</tr>
<tr>
<td>June</td>
<td>6/419</td>
<td>142.6</td>
<td>1.43</td>
<td>6</td>
</tr>
<tr>
<td>July</td>
<td>51/417</td>
<td>367.0</td>
<td>12.23</td>
<td>16</td>
</tr>
</tbody>
</table>

**Table-2. Efficacy of different treatments**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Treatment</th>
<th>No. of lambs recovered</th>
<th>Efficacy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>Foot trimming + Foot bath</td>
<td>18</td>
<td>51.40 a</td>
</tr>
<tr>
<td>Group II</td>
<td>Foot trimming + Antibiotics</td>
<td>20</td>
<td>57.14 a</td>
</tr>
<tr>
<td>Group III</td>
<td>Foot trimming + Foot bath + Antibiotics</td>
<td>28</td>
<td>80.00 b</td>
</tr>
<tr>
<td>Group IV</td>
<td>Foot trimming + Foot bath + Antibiotics + Topical medications</td>
<td>33</td>
<td>94.30 b</td>
</tr>
</tbody>
</table>

Values with different super scripts differ significantly *(p<0.01)*.
Results and discussion
Out of 155 cases, based on the characteristic clinical signs and microscopical examination (Barrow and Feltham, 1993), (Fig. 2) 140 cases were tentatively grouped as those suffering from overgrown hooves, and crack in the foot.

Incidence of foot rot was greater in frosty weather (February), wet summer (May) and rainy months because of wet underfoot conditions in pasture and sheep houses (Carter et al., 1994).

The treatment and control of ovine foot rot is based on several management practices that decrease predisposing factors. The efficacy of various treatments practiced is given in the Table-2. Among the four treatments, groups III and IV were found to respond better than groups I and II.

In group-I, only 51.42% of lambs responded to treatment. However due to certain ill-effect of formalin it is no longer recommended as an external disinfectant. It also tends to harden the hooves with repeated use (Seaman and Marilyn Evers, 2006).

In group II, the antibiotic Streptopenicillin showed marginal improvement (57.1%, Table-2) over group I, in the control of foot rot.

The combined treatment of foot trimming, foot bath and use of antibiotic (group III) was more efficacious (80.00%, Table-2) than the previous groups.

In group-IV, the percent of efficacy was 94.3% (Table-2). The topical application with Oxytetracycline (5%) may reduce the secondary bacterial contamination of infected wound, and help early healing of the foot rot wound. Topical application aids recovery by delivering the medication directly onto the freshly pared foot before it gets covered with dirt and debris. The foot rot organism is susceptible to a wide variety of medication, if provided it come in contact with the organism.

For preventing foot rot, foot trimming should be done at least one to two times per year as a part of normal management practices and more often in conjunction with footbaths. When trimming feet, it is important to disinfect the trimming instruments (foot shear, hoof pare, or knife) after each use to prevent spreading of the infection.

*Dichelobacter nodosus* does not survive in the environment for more than 4 days even under the most favourable conditions but may persist for many years in the feet of infected sheep, even under dry conditions. It cannot invade dry healthy feet and it can establish if conditions are right for the development of dermatitis between the claws. Thus it is of paramount importance that the animal shed is maintained, as far as possible in a dry condition. There should be proper drainage to urine and in slatted floors special care should be taken to remove the caked materials from obstructing the free flow of urine and dung from the floor. In countries where vaccines against *D. nodosus* are available, periodical vaccination should be practiced in farms.

Summary
A total of 155 cases with lameness were presented for treatment from January, 2009 to July, 2009. Among 155 cases, 140 lambs were tentatively diagnosed as positive for foot rot. All the cases with foot rot were treated using different treatment regimen. The combined treatment of foot trimming, foot bath with 10% formalin, use of antibiotic (Streptopenicillin @ 20mg/Kg BW) and also topical medication with tetracycline proved to be effective (94.3%). The predisposing factors and factors for prevention and control of foot rot were discussed.

References


