FOOT ROT VACCINE TRIAL AT MENIFO SHEEP BREEDING AND DISTRIBUTION CENTRE, PAPUA NEW GUINEA

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ABSTRACT

Foot rot is a problem with sheep at Menifo Sheep Breeding and Distribution Centre in the Eastern Highlands Province of Papua New Guinea. This experiment was conducted in 1987 and 1988 to find out the effects of the foot rot vaccine Vaxall Norot *(Websters) against other management practices. There was loss of live weight in the vaccinated group of sheep, while no significant differences were observed between the treatment groups. This suggests that other control and management practices are adequate for controlling foot rot at Menifo and other sheep multiplication and distribution centers throughout Papua New Guinea.*

Key words: *Disease, bacteria, Vaxall Norot, foot bath, Eastern Highlands, not significant*

INTRODUCTION

Foot rot is a contagious disease of ruminants caused by the bacteria *Bacteroides nodosus* and *Fusobacterium necrophorum*. The disease occurs as a result of the combined interaction of these and other micro-organisms such as *Coryriebacterium pyogenes*. The disease is present in Australia, New Zealand, United Kingdom and other parts of the world (Egerton 1981, Claxton and Steward 1982, Morgan 1987) including Papua New Guinea (PNG).

Therefore this experiment was done to investigate the effect of the foot rot vaccine Vaxall Norot (Websters) against other control and management practices at Menifo.

METHODS

The experiment conducted in 1987 and 1988. because Menifo is the largest sheep distributing centre in PNG and foot rot on sheep is present there. Vaccination of sheep could become part of the control measures at Menifo and other sheep distributing centers in the country.

One hundred and fifty Highlands half bred ewes were randomly selected and provided by Menifo Sheep Breeding and Research Centre. Zinc sulphate solution (10%) and Vaxall Norot – Polyvalent Ovine Vaccine (Websters) were obtained from the Goroka Vetinary Clinic.

On day 1, 150 Highlands, half bred 2 tooth ewes were randomly selected. They were then subdivided into three groups of 50 sheep each.

Group 1 was foot trimmed and vaccinated (1ml/ sheep) with Vaxall Norot on the left side of the neck. Group 2 was foot trimmed only. Group 3 acted as control. For each group, all ewes were weighed, body conditioned, sheared and any foot lesions present scored according to Stewart *et al.* 1982. All the ewes were put on 10% zinc sulphate solution footbath for 30 minutes. The whole group was put into a separate paddock for closer monitoring throughout the experimental period and from day 2-13th daily inspections and physical recording were done. The size and nature (close rupture) of the vaccine reactions were recorded and inspected for any fly strike. The size of the reactions were estimated by digital palpation.

At day 14, second treatment were given, that is repeated the first day treatments. The vaccinated group were injected on the right side of the neck. From day 15-20, daily inspections and recordings were done. At day 21, day 1 treatments were repeated, except that group one were not vaccinated. From day 22-27, daily inspections and recordings were done, except on Christmas Eve and Christmas day. At day 28, day 1 treatment were repeated, except that group 1 were not vaccinated and reweighed.

Then all the sheep had a detailed weekly examination for ten (10) weeks. During this period all the groups of sheep were weighed and body condition scored. Final weighing and body conditions were done at the end of the trial.

RESULT AND DISCUSSION

Foot Lesions

The foot rot challenge was significantly low presumably due to unfavourable environment conditions and the treatment given.

Table 1. **Rainfall (mm) at Menifo during the trial period**

	Dec.	Jan.	Feb.	March
Number of Rainy days/month	14	12	11	17
Total Rain fall	799			
Mean rain days/month	14.01			

Live Weight Change (kg)

The mean weight of group 1 was 3.5 kg, group two 6.2 kg, and group three 6.9 kg. This shows that group 2 and group 3 are not significantly different from group 1.

From the analysis of variance, the treatments caused difference in live weight gain by 0.2%. The variance between groups 1 and group 2 was singnificant at 0.1% and between group 2 and group 3 was significant at 10%.

Table 2. **Live weight change (kg)**

	Mean	Sum of X	Sum of Square
Group 1	3.5	157.5	716.25
Group 2	6.2	293.0	1994.50
Control	6.9	345.5	2665.75

Table 3. **Changes in Body Condition of Sheep**

	Mean	Sum of X	Sum of Square
Foot trimmed & vacinated	0.411	18.50	23.75
Foot trimmed only	0.989	46.50	58.25
Control	0.78	39.00	47.50

Similar findings as for the live weight change. The means of group 2 and group 3 are not significant as compared with group 1. From the analysis of variance, the treatments caused difference in the change in the body condition. Scores by 0.1%. The variance between vaccinated and non-vaccinated was 0.1% whereas between group 2 and group 3 was 0.1% and within the groups was 5%. It can be concluded that vaccination caused a smaller increase in body condition scores. Foot trimming may have caused an increase in the body condition score changes.

Vaccine Reactions

Lots of animals showed reactions to both the first and second injections. Most of them ruptured and healed at different times. The size of the reactions varied from 1-6 cm in diameter. There was no fly strike recorded, presumably due to close attention paid to the wounds.

DISCUSSION

The observed foot rot challenge was low, presumably due to the fact that the environmental conditions were not favourable throughout the experimental period. The total rainfall was 799 ml and number of rain days ranged from 12 – 17 (Table 1). The rain was not continuous, there were intermittent dry spells. Work by Benjamin A. (1986 unpublished) at Menifo showed that there was no significant relationship between rainfall, number of rain days and foot scald.

Wet and warm conditions will favour the incidence of the disease. Studies in Australia Claxton P.D. and Steward, D.J. 1982, Morgan, K. 1987 showed that the spread of foot rot requires temperatures in excess of 10°C. Both moist and warm conditions favour persistence of the bacteria in the pasture and increase susceptibility of the feet to the injury and dermatitis thus facilitating spread of the disease from carrier sheep.

Hot, dry conditions and healing of the feet are unfavourable for the bacteria to persist on the pasture.

All the sheep, including the control group were put on 10% zinc sulphate solution for 30 minutes every time the treatment was repeated. This could be one of the reasons for the low incidence of infection. Zinc sulphate penetrates ovine of horn more readily then other antibacterial agents like formalin (Skerman *et al.* 1983). A field trial conducted at Wallaceville Animal Research Centre, NZ (Skerman *et al.* 1983), comparing formalin and zinc sulphate showed significant curative effects on foot rot infection of a wide range of severity by zinc sulphate. Skerman *et al.* 1983, also stated that cross and Parker in 1981 showed a pounced recovery rates even without preliminary paring of affected feed or other additional treatments. Similar findings were found by Skerman *et al.* (1983) with combination of foot paring and foot bathing with zinc sulphate.

Vaccination caused a reduction in weight gain whereas foot trimmed only did not. This is presumably an indirect effect of the vaccine reactions. The sheep were injected on both sides of the neck and 96.6% reacted. Those that reached 88% ruptured and healed at different times. Assumption can be made that the vaccine reactions were painful which affected the grazing ability, leading to lower live weight gain.

Similar findings were reported in clinical trials in Australia with Foot Vax Coopers Animal Health (Morgan 1987), 86% of the animals reacted and their were still apparent six to twelve weeks after injection. Vaccination abscesses are features of the use of oil adjuvant vaccines and the data sheet warns against use of Foot Vax prior to shearing, and it is contraindicated in miilking sheep where it causes a drastic fall in yield (Morgan 1987).

According to Blood *et al.* (1983), occasionally vaccination may exacerbate the lameness and sudden development of severe foot abscess.

Changes in body condition scores were similar to the live weight gain change. It is presumed to be due to the same explanation given to live weight change.

CONCLUSION

There was no significant difference between the treatments and the control groups of animals. The only effects was loss in live weight of the vaccinated group of animals. There were more local tissue reactions which led directly or indirectly to lower live weight gain. Other control or management practices are adequate if strict attentions are paid to.

The vaccine should not be used soley to combat the foot rot problem at Menifo for the following reasons;

i. Vaccines are expensive and the immunity provided is short lived, 12 weeks at the maximum, Morgan, 1987.
ii. Severe local tissue reactions occur at the site of vaccination.

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