LIVESTOCK DEVELOPMENT NOTE NO. 4

HEALTH PROBLEMS OF SHEEP IN THE HIGHLANDS OF PAPUA NEW GUINEA

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ABSTRACT

The sheep project in Papua New Guinea Highlands has encountered lots of health related problems. The nematodes, Haemonchus *and* Trichostrongylus *spp and the liver fluke,* Fasiola hepatica *are the most significant. Foot problems and fly strike are also common. Occassionally, deaths have been associated with toxaemia of some sort. It is difficult to make definitive diagnosis on these deaths because the diagnostic laboratory doesn't perform such tests. Poor management also contributed to the problem at the later stages.*

INTRODUCTION

At present there are about 8,000 sheep in the country, of which 70% are on smallholder private farms (Siva per. comm.). Approximately 80% of them are in the central highlands.

Various health problems have been encountered since the sheep were introduced into the country, especially in the well-established proejcts where large numbers are kept. This has prompted an interest to review the health problems encountered by the sheep projects from the beginning to the present. Some of the causes are speculations only and were based on clinical observations of symptoms and failure to respond to therapy.

Furthermore, no attempt is made at the diagnostic laboratory to isolate toxic componds. Therefore there are no definitive diagnostic reports to back this up. With regard to nematodes, since I got invovled with the sheep project I have seen cases both in imported and the Highlands half breeds.

This paper discusses the major problems encountered by the sheep projects according to their aetiology. Much of the data were collected from the National veterinary Laboratory specimen reports from 1977 to 1994, plus personal experience. Most of the reports are from Menifo as lots of work has been done there. However, it also covers the areas where sheep were and are kept. Even though smallholder projects were established around 1979, there is no information available on health related problems. A paper presented by Asiba (1987) at the First Symposium on Sheep and Goat Production in Papua New Guinea points this out. So far there are very limited data available on smallholder projects. According to Manua (1994) losses from parasitism is minimal. He does not mention other causes of deaths,

but emphasis is mostly on performance.

BACTERIA

- *Foot Problems (Foot scald, Foot rot)*

Foot lesions, including toe and heel abscesses, interdigital dermatitis or scald ("benign footrot") are common, especially in the wet season. This problem is not limited to the large flocks or government established farms. I have personally seen cases at Korofeigu and they have been reported in several proejcts in Okapa and Southern Highlands Province in 1992. According to Nunn (1981 and per. com.) the true footrot ("virulent" or "contagious" footrot) was not present. He based his opinion on the grounds that the causal organism *Bacteroides nodosus* was not present, either not being cultured or seen on direct smears. He only mentioned that *Fusobacterium necrophorum*, associated with ovine interdigital dermatitis was common.

From all the clinical symptoms observed on the affected animals, and personal experience I believe that the condition was a true foot rot. Late Brian Nettleton (per. comm.) suspected it in Muli in the early eighties on sheep obtained from Menifo. It was not until 1988 when the organism was cultured and seen on direct smears on the samples I collected and submitted from Menifo, Tambul and Highlands Agricultural College.

- *Pneumonia*

Pneumonia was one of the usual findings during the post-mortem examinations. The cause was not identified, but according to Nunn (1982) pneumonia associated with *Pasteurella* spp is not uncommon, especially in debilitated animals where it is almost certainly secondary to other stresses like gastrointestinal parasites and fascioliasis.

- *Clostridial Diseases*

Little is known of the significance of the clostridial diseases, although presumptive cases of enterotoxaemia have been reported to the National Veterinary Laboratory (Nunn 1982). In 1992, deaths of some of the 1991 imports may have been due to the clostridial infections. I made this assumption based on the autopsy findings and comments made on samples submitted to the National Veterinary Laboratory. Furthermore, in 1994 few cases of tetanus were diagnosed based on typical tetanus clinical symptoms.

- *Poisoning*

There was only one major poisoning associated with over-dosing when a total of 72 ewes died, mostly the Highlands Half Bred in 1987. This particular group was injected with Cujec (Diethylamine Copper Oxyquinoline Sulphate) (Coopers). The recommended dose rate was 1ml/15 kg liveweight (6mg/ml), however an injection with a dose rate of 3ml per ewe was used. The weight of the sheep ranged from 30 to 44 kg and it was the lighter group (Highlands half bred) that were most affected.

The histopathological lesions were consistent with those reported for injectable copper poisoning by Bostwick (1982). The flock was treated with ammonium molybdate (10ml/ewe) and anhydrous sodium sulphate. Since then there were no more deaths.

Cases of deaths associated with symptoms of photosensitivity have been reported. This could be due to fungus (*Pithomyces chartarum*) or plant toxins. In one case spores resembling the spores of the above fungus were found in the sample of signal grass (*Bracharia decumben*) submitted to the plant pathology section. However, it is

difficult to pinpoint the causal agent as it is a minor problem and of less concern.

At the beginning of 1992, lots of 1991 imported sheep died of various reasons. In most cases, the causes were not identified either in the field or at the diagnostic laboratory. According to the laboratory reports, some of the historpathological findings were associated with some type of toxaemia. From the clinical history and observations those that died were weak and anaemic. Some ewes, even weaners and lambs showed paresis, muscle tremor, staggering and finally recumbency and death in coma. Such findings can be attributed to some sort of poisoning. Similar clinical findings are reported by Blood and Henderson (1903) involving plant poisoning, e.g., *Setaria sphacelata* which contains 7% oxalate. They further reported that it is more likely to affect animals which are travelling and recently introduced than indigenous animals and as a group pregnant and lactating animals are more susceptible than others. This is the type of mismanagement the imports were exposed to, plus in the group the animals that were pregnant and lactating. After some advice to change the management practice, the problem eased.

Table 1. SHEEP FAECAL EGG COUNTS (NEMATODE E/G). (50/94)

	Dates	
	14/2/94	21/2/94
Ear Tag No.	Eggs	Eggs
7	440	200
80	11740	120
152	1900	440
163	2260	2640
208	1700	1380
293	2460	400
372	3550	160
428	5700	7240
487	7060	8080
490	2120	2340
527	1400	1180
537	9640	7480
582	3680	ND
629	1980	320
919	2020	2040
Mean	3843	2430

ND = *Not done*

PARASITES

The cost of disease caused by worm parasites is prbably higher than that of any other disease of sheep. The gastrointestinal nematodes are major diseases in the affected flocks set stocked for any length of time and fascioliasis in the liver fluke infestated areas. With regard to external parasites, screw worm fly is of some concern.

- *Round Worms*

Majority of the deaths and autopsies were attributed to parasitism. The worst problem occurred in 1993 during the prolonged dry period that was experienced throughout the country. One day at Menifo eight 1993 imported sheep were reported dead. Six were autopsied. The body conditions ranged from fair to very thin and had pale mucous membranes. The thoracic cavities contained abnormal amount of clear fluid. Grossly the small and large intestines were empty. Some contained very small amount of watery contents. The rumen contained some chewed up grasses which appeared watery in consistency. In two carcasses, the

Table 2. LARVAL CULTURE FOR SAMPLES COLLECTED 14/2/94

Sheep No.	Species			
	% *Heamonchus*	*Cooperia*	*Strongyloides*	*Trichostrongylus*
80	-	4	2	94
152	49	2	-	49
163	-	-	-	100
208	-	-	-	100
293	-	1	1	92
372	-	-	1	99
428	-	-	-	100
487	-	-	6	94
490	-	-	-	100
527	-	-	-	100
537	74	-	10	16
582	-	-	-	100
629	4	-	4	92
919	-	-	2	98

NOTE:

1. *Trichostrongylus* was clearly the dominant worm at the time of sample collection, but it may be a seasonal dominance. Later samples had *Haemonchus* spp as dominant worm.

2. Faecal samples collected one month later from 50 sheep had very high faecal egg counts per gram of faeces.

   Mean = 11,501.2 eggs/g faeces
   Range = 80 to 35,960 eggs/g faeces

mesenteric fat were normal while in the rest ranged from none to the stage where it was turning into gelatinous material. Gelatinous material was also present under the jaw of three carcasses. Significant findings were located in the abomasae. The mucosae of all were hyperaemic with oedamatous abomasal folds. Contained blood stained fluid, soil and few grass seeds. In addition, massive numbers of tinny pinkish coloured worms were present. Under the microscope, the worms were identified as *Haemonchus* spp. Trial by Owen (1981) at Menifo over two years found *Haemonchus* and *Trichostrongylus* spp as the dominant worms. These two species were also identified from the faecal samples submitted in 1994 (Table 2). Owen (1981) also found that worms were plentiful on the pasture throughout the year.

Other species were also present, but how much they contribute to the problem is questionable. According to Nunn (1982) heavy infestations of *Oesophagostomum* spp have been recorded in several flocks.

Despite advice on some management practice changes the problem continued into 1994. Other Veterinary officers were invited to assist. They found the same problems and despite their assistance, the sheep continued to die, even in the quarantine shed and paddock.

On three occasions, faecal samples were submitted for egg counts. In all, the number of eggs counted were in thousands, even after drenching and a change of anthelmintic from benzimidasole to Nilverm (Table 1). After consultation with the Veterinary Parasitologist it was explained that large numbers of eggs does not necessarily mean presence of drug resistance. The fault could be associated with the management practices. For example, anthelmintic used, under dosing, faulty drenching gun, faulty drenching techniques and grazing the same part of the farm for too long. In addition, it was suggested therefore to do a preliminary drug resistance trial. After preparing and finalising the protocol, the idea was abandoned for some unknown reasons.

In my opinion the part of the farm utilized was grossly contaminated with parasite eggs and larvae as it was grazed for too long. Eastern Highlands have favourable environmental conditions for the parasite to survive for long period. According to Owen (1981, per. comm.) and Dash (1988) it would take about five to six months for paddocks to be "clean". Therefore, despite the fact that the sheep were drenched and put on a "clean" paddock, they still picked the larvae from the paddocks as the period of spelling paddocks within that part of the farm was not long enough.

- *Fascioliasis*

Fascioliasis due to liver fluke, *Fasciola hepatica* is an important parasite of sheep and can infect a wide range of species. Owen (1988) cites Talbot (1972) that the parasite was brought into Papua New Guinea with sheep from Eastern Australia and became established in those part of the highlands where the intermediate snail host (*Lymnaea viridis*) lives. The snail host is absent from altitude less than about 600 m above sea level in Papua New Guinea. This has been confirmed by Owen (1989) when he conducted a survey to discover the distribution of the snail in the country. He also found that temperature and moisture controlled the activity of the intermediate host plus the incidence of fascioliasis.

When the sheep farm was established at Menifo in 1975, it soon became apparent that fascioliasis was going to be a health problem (Owen 1989). It is now endemic at Menifo and high proportion of losses have

been attributed to the acute form or a "subacute" form (Nunn 1981). The prime factors which influence the intake of *Fasciola hepatica* from the pasture by animals is the amount of rainfall in a given period, say greater than 125 ml for several consecutive months. This creates conditions favourable for snails to move to the pasture that otherwise would be too dry and release metacercariae. However, Owen (1989) reported that sheep were able to pick up metacercariae throughout the year at Aiyura, even when rainfall was less than 125ml per month. This was possible because parts of the swampy area remained permanently wet and there were snails active during the dry season.

In 1994, five sheep died at the DPI Korofeigu station. They were at a later stage of pregnancy, therefore, under some stress. Autopsy findings included chronic fascioliasis and acute pneumonia.

- ***Screw Worm Fly***

Fly strike due to the screw-worm fly *Chrysomia bezziana*, is a singificant problem, requiring regular flock inspection to treat wounds before strike occurs. It affects all species of animals and normally requires a break in the skin of the host, or seepage before a site becomes attractive for eggs laying. According to Owen (1981) with sheep a break in the skin may not be necessary. Soiling of the anus or vulva or any part of the body may be sufficient to make the animal attractive to the fly. Sheep, therefore, are the most susceptible livestock's animals for crew worm strikes.

- ***Sheep Lice***

Sheep lice, *Damalinia ovis*, was deteched in flocks at Wapenamanda, Yogos, and Muli in 1977 and later at Bena Bena (Nunn 1982). It was also detected in 1986 in various locations, including Menifo. On both occasions intensive eradication program was attempted and was successful in each case.

NUTRITION

During the autopsies, one of the common findings was those symptoms associated with starvation. These findings were mainly true at Menifo despite sheep being fed sheep pellets. The body conditions varied from fair to very thin. Upon incision there was no storage fat on the mesenteries, base of the heart, and under the skin. Sometimes this was replaced by gelatinous material. The carcasses generally appeared pale. The small and large intestines were usually empty and gall gladder fully extended with bile.

It is likely that the sheep were/are exposed to subclinical parasitism, gradually reducing their appetite. Consequently, they have a reduced growth rate and weight gain or reduction in body weight. Furthermore, under stressful conditions the subclinical parasitism then becomes apparent.

It is difficult to notice the effects of subclinical parasitism. The farmer(s) do not realise it and only becomes apparent under stressful situations.

SUGGESTIONS ON CONTROL MEASURES

Since the data on smallholder projects is limited or the problem is minor, deworming should be done say once or twice a year. There is a need to collect health related data from such projects to assist in formulation of control measures as well as to give more appropriate advice to the farmers.

With the well-established or government

run farms the management practice should be such that the problems are minimised. For example, submission of monthly faecal amples for egg counts and deworming should be based on the results. As large number of animals are kept compared with the smallholders the grazing practice should allow efficient utilization of the pasture. For example, rotational grazing of the whole area of the farm needs to be practised. Dividing the herd into several groups, for example, body weight, age and pregnancy status would also assist. This will allow preferential grazing based on individual group requirements. The quantity and quality of the pasture be improved by means of application of fertilizer or sowing improved species. Use of antibiotics in association with other control measures for problems such as foot lameness and pneumonia. Other measures can be instituted as the problem arises.

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