

ANIMAL HEALTH CONSTRAINTS TO CATTLE PRODUCTION IN THE SOUTHERN HIGHLANDS OF TANZANIA

F.M.N. Akarro and J.K. Maro

Uyole Agricultural Centre, PO Box 400, Mbeya, Tanzania

ABSTRACT

In a livestock performance survey carried out in the Southern Highlands of Tanzania, diseases were singled out as the main constraint to cattle production. Tick-borne diseases, and in particular East Coast fever (ECF), ranked highest on the list of diseases of economic importance. Of the endoparasitic diseases, Fascioliasis was the major constraint.

In studies of foot and mouth disease (FMD) epidemiology carried out in Mbeya, some strong indications of seasonal variation were recorded, with a higher incidence of the disease in the dry season than in the wet season. The reasons put forward for such observations were the increased movement of livestock in the dry season in search of water and pasture. Outbreaks in Mbeya were mainly due to inadequate vaccine supply, in-efficient imposition of quarantine measures during outbreaks, badly maintained stock routes and enclosures, and the increasingly high price of FMD vaccine, which, in most cases, livestock keepers cannot afford.

The occurrence of liver disease in cattle was partly associated with plant poisoning. Several poisonous weeds were responsible: Senecio ruwenzoriensis, Crotalaria brevis, Crotalaria incanna and Crotalaria polysperma. Frequent slashing and manual uprooting of suspect weeds from grazing pastures is therefore recommended.

In another study involving the epidemiology of nematode worms in cattle, heavier infections were recorded during the wet seasons than during dry seasons. A strategic deworming approach rather than continuous dosing is required. The main nematode worms isolated were Haemonchus, Bunostomum and Oesophagostomum.

The main causative agents of cattle mastitis in the Southern Highlands were Streptococcus (isolated from 35% of cases), Staphylococcus (18.2%), Corynebacteria (14.2%) and Escherichia coli (13.4%). Other less frequently occurring pathogens included Pseudomonas, (4.8%), Proteus (1%), Lactobacillus (2.9%) and Klebsiella (1%).

In an abattoir survey of Brucellosis sero carried out in Mbeya region, 25% of local cattle gave a positive reaction.

In a study of bovine pink eye disease (PED), both subcutaneous and subconjunctival drug administration significantly reduced the disease incidence. Moraxella bovis, a gram negative bacteria, was isolated as the main cause of PED.

INTRODUCTION

The Southern Highlands of Tanzania incorporates four regions (Mbeya, Iringa, Rukwa and Ruvuma) and has an area of 247 km², 26% of Tanzania's total land area, and a human population of 2.5 m. The livestock population includes 1.8 m indigenous cattle, 15,330 improved dairy cattle, 233,830 sheep, 582,350 goats, 142,890 indigenous pigs and 25,850 improved pigs (MALD, 1986).

In Tanzania, the traditional cattle sector, which caters for all national beef requirements and is the sole source of milk in the rural areas, occupies about 97% of the national cattle herd of about 12 m cattle (MALD, 1986). In the Southern Highlands of Tanzania traditional cattle are kept for many purposes, including as a source of cash income, for milk, and meat, for ploughing, as a dowry, and for transport and funeral ceremonies (Akarro, 1987).

The major constraints to cattle production in the Southern Highlands are tick-borne diseases

(especially east coast fever, ECF), foot and mouth disease (FMD), Blackquarter, Trypanosomiasis, Mastitis and Brucellosis. Improved cattle are much more susceptible to these diseases than local cattle.

The objectives of this paper are to review research on the causative agents of cattle diseases and corresponding remedial practices, to review the major health constraints to cattle production in the Southern Highlands, and to prioritize future research for increased cattle production in the Southern Highlands.

RESEARCH REVIEW

Traditional cattle studies

A survey of constraints to cattle production in Mbeya produced the following ranking (Akarro, 1987):

1. *Diseases.* Tick-borne diseases were the main disease problem throughout the region, causing up to 60% mortality in calves.
2. *Inadequate pastures.* Lack of pasture posed a serious constraint throughout the region, particularly during the dry season, aggravated by an influx of cattle to Chunya District, termites in Ileje District, and floods in Kyela District.
3. *Shortage of drinking water.* Water shortage during the dry season was a serious constraint in Mbeya Rural, and in Chunya and Mbozi Districts.
4. *Limited extension services.* Inadequate drug supplies and a poor marketing infrastructure for milk were serious constraints throughout the region.

Inspection of carcasses in abattoirs in Mbeya Region revealed that *Paramphistomiasis* and *Fascioliasis* were the greatest constraint to traditional cattle performance (Table 1).

Mastitis studies

Mastitis studies in cattle carried out from 1988 to 1991 in the Southern Highlands established the following order of importance of causative agents: *Streptococcus*, *Staphylococcus*, *Corynebacteria*, *Escherichia coli* (Table 2). These results were similar to those obtained by Mbise *et al.* (1983) working in Arusha, Njau and Kundy (1983), in Dar es Salaam, Mahlau and Hyera (1984), in Iringa and Machangu and Muyungi (1988), in Morogoro. Tests of these four species demonstrated considerable resistance to antibiotics, particularly to Penicillin G and Novabiocin N (Table 2).

Table 1. Prevalence of cattle diseases in Mbeya Region: percentage of affected carcasses in abattoir studies

Disease type	Incidence (%)	Disease type	Incidence(%)
Paramphostomiasis	65.98	Fascioliasis	55.38
Respiratory disease	14.33	Tuberculosis	11.98
Hydatidosis	5.18	Reproductive disease	8.00
Renal diseases	5.60	Cysticercosis	2.60
Monieziasis	1.73		

Source: Akarro, 1989.

Table 2. Frequency of mastitis isolates from cattle in the Southern Highlands and their resistance to antibiotics

	Year				Frequency		Antibiotic resistance ¹	Partial antibiotic resistance
	1988	1989	1990	1991	Total	(%)		
Streptococcus	8	14	7	9	38	35	P	N,CI,L
Staphylococcus	6	8	3	2	19	18	P	CI,Ce,L,N,A
Corynebacteria	4	2	8	1	15	14	N,L,P,T	A
E. coli	1	1	6	6	14	3	CI,N,P,T	Ce,L
Pseudomonas	0	3	1	1	5	5	T,A,S,Tr	
Proteus	0	0	3	0	3	3		
Lactobacillus	0	0	3	0	3	3		
Klebsiella	0	1	0	0	1	1		

¹P, Penicillin G; N, Novabiocin; CI, Cloxacilin; Ce, Cephalloridine; L, Lincomycin; A, Ampicillin; T, Tetracyclines; Tr, Trimethoprim; S, Sulphametazole.
Source: Akarro and Minga, 1992.

Endoparasite studies

Quantification of nematode worm infection in untreated grazing steers was carried out by faecal egg harvesting and total worm counts in slaughtered animals. Three worm isolates were identified: *Haemonchus* from the abomasum, *Bunostomum* from the small intestine and *Oesophagostomum*, from the large intestine (Table 3).

The effect of anthelmintic treatment on the control of endoparasites was studied over a period of 12 months with grazing steers. There was a significant reduction in faecal egg output in treated animals. The number of eggs per gram of faeces in the control group was generally greater during the wet season than during the dry, partly because of the increased level of contamination of pastures with infective larvae during the wet period. These results support the findings of Allonby and Urquhart (1975). The observations suggest the need for strategic deworming rather than the current continuous deworming programmes practised by many farmers.

Brucellosis studies

In a Brucellosis survey of cattle in abattoirs in Mbeya Region, the number of positive reactors ranged between 6 and 26% (Table 4). The results were comparable to findings by other workers (Mahlau, 1967; Shaka, 1976; Kitaly, 1984; and Oturu, 1985).

Pink Eye Disease studies

Survey work carried out at UAC involving improved cattle revealed no statistical difference in the occurrence of pink eye disease (PED) between the dry and wet seasons. Young grazing cattle seemed to be much more susceptible to the disease than adult cattle, while animals kept indoors were least affected (Akarro and Maro, 1980).

The use of locally made vaccine containing inactivated *Moraxella bovis* had a significant impact ($P < 0.05$) on disease incidence (Akarro and Maro, 1980). Subcutaneous and subconjunctival vaccination methods were equally effective (Table 5).

Table 3. Worm burden levels in grazing cattle, estimated from slaughtered animals

	Total worm count	Mean worm length (mm)	Common spp
Abomasum	339	23.7	<i>Haemonchus</i>
Small intestine	241	22.0	<i>Bunostomum</i>
Large intestine	280	16.0	<i>Oesophagostomum</i>

Table 4. The prevalence of Bovine Brucellosis in Mbeya Region

	1990 Season		1991 Season	
	No. of samples	No. positive	No. of samples	No. positive
Chunya	15	26.7	22	13.6
Igalula	34	26.5	35	6.0
Kamsamba	-	-	70	15.7
Mbalizi	-	-	11	18.0
Rujewa	5	20.0	-	-
Usangu	45	26.7	74	23.0
Total	99	26.3	212	35

Source: Akarro, 1992.

Table 5. The effect of subcutaneous and subconjunctival vaccination on the incidence (%) of Pink Eye Disease

	Weeks after vaccination							Least square means ¹
	0	4	8	12	20	24	32	
Control	14.9	18.8	12.9	17.7	21.0	19.9	10.	13.11
Subcutical	12.7	13.7	5.9	4.9	3.4	3.4	0	6.43
Subconjunctive	18.7	10.9	6.5	3.2	2.1	5.3	0	6.67

¹In a column, different superscript letters denote statistical difference at (P<0.05).

Source: Akarro and Maro, 1980.

Foot and Mouth Disease studies

Studies of foot and mouth disease (FMD) epidemiology in cattle in Mbeya Region, covering the period from 1968 to 1983, revealed that a total of 58 confirmed outbreaks had taken place (an average of 3.9 per year). Thirty seven of the outbreaks occurred in the dry season (August-December) and the remaining 21 during the wet season (January-June). The higher incidence observed during the dry season can be partly explained by increased livestock movement in search of drinking water and better pastures (Akarro, 1983). The FMD strains recorded included O, A, SAT I and SAT II. The incidence of FMD in Mbeya Region is generally high, possibly because of inadequate supplies of FMD vaccine.

Weed poisoning studies

Weed poisoning in grazing cattle has been associated with the development of liver disease, characterized by progressive loss of condition, poor productivity, impaired vision, dragging of hind legs, loss of balance, recumbency, rectal prolapse, and eventually death (Akarro *et al.*, 1983).

Certain poisonous plants, namely species of *Crotalaria*, *Lantana*, *Lippia*, *Senecio*, were suspected as causative agents since they contain hepatotoxic substances (pyrrolizidine alkaloids) which can cause liver insufficiency syndrome and photosensitization (Cordy and Blaine, 1956; Blood and Henderson, 1968).

Animals fed on *Senecio ruwenzoriensis* and *Crotalaria polysperma* died after an average period of 23 weeks while those fed on *Crotalaria incanna*, *Crotalaria brevis*, *Lantana trifolia* and *Lippia*, died much later (44 weeks) after they had developed slight liver cirrhosis.

ACHIEVEMENTS

The following is a list of the main achievements in the area of improvements to animal health over recent years:

- *Tick and tsetse control measures.* Farmers appreciate the importance of both tick and tsetse control measures. Small scale farmers normally control tick-borne diseases by handspraying. For tsetse control, the commonest method adopted is chemoprophylaxis, which is mainly based on the use of Isometamidium Chloride on a regular basis. Continuous bush clearing is also done to reduce the tsetse population.
- *Procurement and utilization of animal drugs.* There has been an increasing effort on the part of farmers to procure drugs to improve animal production. This applies to the owners of both traditional and improved cattle. Consequently cattle mortality rates have declined.
- *Increased use of improved dairy cattle.* A reasonable number of farmers have been able to improve the environment to support and accommodate improved cattle genotypes. At the moment, the demand for improved dairy cattle outstrips the supply.
- *Increased demand for pasture seeds.* The demand for pasture seed has increased as farmers attempt to establish improved pasture.
- *Importance of mastitis control.* Farmers are quite knowledgeable about the negative impact of mastitis on milk production and marketing. Farmers are also aware of the ever increasing mastitis costs of treatment when the disease occurs and are therefore now much more careful about milking hygiene. A few farmers can detect mastitis in the early stages and as a result spend less money on treatment.
- *Control of Brucellosis.* Farmers are now knowledgeable about the impact of Brucellosis in terms of reduced conception rates, abortion and reduced milk production. Some farmers are currently stressing the need to subject dairy cattle to Brucellosis testing prior to purchasing as a safeguard against possible future losses.
- *Control of foot and mouth disease.* Farmers are currently aware of the negative impact of foot and mouth disease on milk production, draft power and cattle performance in general. Consequently, the need for routine vaccination is well appreciated by most farmers.

MAJOR CONSTRAINTS TO THE ADOPTION OF DISEASE PROTECTION MEASURES

Veterinary inputs are expensive, partly because of the devaluation of the Tanzanian shilling. Unfortunately, over 95% of the veterinary inputs in Tanzania are imported. The Government should consider the possibility of establishing its own local industry for veterinary products.

Apart from the problem of the high cost of veterinary inputs, farmers also face prolonged shortages of supply. For example, the supply of biological vaccines such as those against foot and mouth disease and Brucellosis is erratic. As a result disease control has been unsatisfactory.

For a long time now the management of dip tanks has been under the control of local government. As a result of insufficient allocation of funds by district councils, it has not been possible to manage the dip tanks properly. Consequently, most of them have broken down and others have failed to operate because of a lack of acaricide and water point installation.

The demand for extension service staff is increasingly greater than the supply. As a result, some areas, especially the rural areas, have a severe shortage of livestock extension workers. In addition

there is a tendency for the extension officers to concentrate mainly in the field of animal health. As a result, other fields of animal production are not adequately covered. This is a big constraint, and there is an urgent need to improve this situation.

Although some cattle farmers have successfully improved their pasture to cater to exotic genotypes of cattle, the improved breeds are not always available to buy. When the animals are available, the price may be prohibitively high.

MINIMUM REQUIREMENTS FOR INCREASED CATTLE PRODUCTION

An improved animal health control programme is a pre-requisite for the establishment of successful cattle farming enterprise. It forms the basis for the improvement of the environment for the cattle. In particular the problem of tick and tsetse fly control has to be addressed. Appropriate strategies for the control of endoparasites are also important. In the Southern Highlands, some areas are severely infested with Fascioliasis, which is the most serious endoparasite problem in cattle in the zone.

Adequate nutrition of cattle needs to be emphasized. The emphasis should be on the establishment of improved pastures with a better nutritive value than that of the natural pastures. Concentrate supplements should be made available to maximize the genetical potential of the improved animals.

Improved management and husbandry in the form of the provision of a water supply and shelter and the differential management of various age groups should be encouraged in order to improve cattle productivity.

Once all these aspects of the environment have been improved, then is the time to consider the possibility of acquiring improved breeds to be raised within this improved environment. Cattle owners should then continuously modify and create micro-environments to suit different genotypes. For example, for hotter environments such as the coastal belt, smaller breeds such as the jersey are more suitable than larger breeds such as the friesian. In general purebreeds may not be as appropriate as crossbreeds for the coastal belt because they may suffer from heat stress. In brief, the performance of any given improved breed will depend on the extent to which the environment has been modified and/or improved to suit their needs.

FUTURE RESEARCH AREAS

In conclusion, it is suggested that the following topics merit further research:

1. The impact of better disease control measures on animal production under smallholder conditions.
2. Testing of various interventions to control bovine mastitis in smallholder dairy cattle.
3. Investigation into the causes of prolonged post-calving anoestrus periods in cattle and its relationship to post-calving endometritis/retained placenta syndrome.
4. Testing and assessment of various pharmaceutical preparations in the control of lungworm in young cattle.
5. The epidemiology in weaned calves and kids and tests of the efficacy of different pharmaceutical preparations on tapeworm incidence and prevalence.
6. Investigation of the reproductive wastage in small ruminant production under smallholder conditions.
7. Epidemiological studies of African Swine Fever disease in the Southern Highlands.

8. Testing of the efficiency of different pharmaceutical preparations on Ascariasis in pigs.
9. Investigation of plasm levels of phosphorus in both grazing and stall-fed cattle and the impact on reproduction. The interrelationship with levels of phosphorus in soils and forages should also be studied.

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