

EAST COAST FEVER AS A CONTINUED CONSTRAINT TO LIVESTOCK IMPROVEMENT IN TANZANIA: A CASE STUDY

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SUMMARY

An investigation was carried out into the cause of deaths in a recently established dairy farm with 211 animals. Clinical examination revealed that 14 out of 15 sick animals were depressed, pyrexia, anorexia and had variable degrees of respiratory distress and enlarged lymph nodes. These clinical signs were suggestive of East Coast fever (ECF). This was confirmed on positive demonstration of piroplasms and macrophages in blood and lymph node smears respectively, and on post-mortem examination. Parasites were also demonstrated in smears taken from 5 other animals which were pyrexia and had enlarged lymph nodes. Epidemiological investigation revealed that the occurrence of the disease was associated with contact with tick-infested pastures and unsatisfactory tick control due to improper dipping of the herd. The use of pasture by pastoral cattle which are rarely dipped also increased tick infestation. It is concluded that, unless effective disease control is applied ECF will continue to be a major killer disease of cattle in Tanzania.

INTRODUCTION

The Tanzanian livestock industry has over 12.8 million cattle (Shayo and Mlay, 1986), the majority being indigenous zebu cattle (*Bos indicus*) raised mainly by traditional pastoralists. A small percentage (<5%) consists of pure taurine dairy animals of European origin or their crosses with *Bos indicus* (F1-3) which are raised on large state-owned farms as well as by small scale private dairy farmers.

The importance of tick-borne diseases in Tanzania has been widely reported. For instance, a study carried out in northern parts of Tanzania showed that 49.2% of the reported clinical cases of disease in cattle were caused by tick-borne infections, of which 73% were due to East Coast fever (ECF) (Nyange and Mbise, 1986). This was in agreement with the finding that ECF accounted for most mortalities of all cases reported to Veterinary Investigation Centres (VIC) (Matovelo *et al.*, 1987).

Small scale dairy farming is increasing around many Tanzanian towns and the majority of these animals are the F1-3 (taurine/zebu) crosses which are known for their improved resistance to tropical diseases compared to pure European dairy animals. However, many small scale farmers are wary of keeping such animals because of increased disease risk compared to pure indigenous cattle. Recently, however, a number of farmers have attempted to establish relatively big farms.

This paper describes the investigation of a reported outbreak of a disease of unknown aetiology in August 1992 (dry season) on a newly established dairy farm near Morogoro. The herd consisted of 211 animals purchased within the previous month from various locations in Tanzania. Fifty-five animals were pure Friesians and Jerseys purchased from relatively cool highland regions (Arusha and Mbeya) and 156 were F1-3 crosses bought within Morogoro region from 2 farms 20 km

and 50 km away from this newly established farm. At the time of reporting, the farm had lost 10 animals in 4 days, and had identified and isolated 15 sick animals.

MATERIALS AND METHODS

On the first visit to the farm all animals were clinically examined and the rectal temperatures recorded. Thick, thin and wet blood smears were taken from the ear or jugular vein of all animals. Wet smears were examined immediately for trypanosomes which were subjected to a preliminary identification on the basis of their motility. Smears were also prepared from biopsies of enlarged prescapular lymph nodes. Lymph node and blood smears were fixed in methanol, stained with Giemsa and examined for trypanosomes, *Anaplasma* and *Babesia* spp. and *Theileria parva*. Identification of the parasites was based on their morphology (Soulsby, 1982). In addition, unclotted blood samples in heparinized vacutainer tubes were tested for haemoglobin (Hb) and packed cell volume (PCV) by the cyanamethaemoglobin and microhaematocrit capillary tube methods respectively (Baker and Silverton, 1976).

Investigations were made to determine the source of the newly introduced animals, contact with neighbouring pastoral cattle, frequency of dipping, vaccination and inoculation regimes prior to and after introduction of the animals, type of acaricide in use and ways by which animals were transported to the farm.

RESULTS

Clinical status

Clinical examination of the 15 animals in the sick group exhibiting pyrexia ($>40^{\circ}\text{C}$) showed that 14 had variable degrees of depression, respiratory distress, anorexia, weakness and enlarged prescapular and precrural lymph nodes. These clinical signs were suggestive of ECF. The results (Table I) of examination of lymph node and blood smears showed that 14 of the 15 sick animals had schizonts and piroplasms of *Theileria parva*, one of which was also infected with *Babesia bigemina* and 2 with *Trypanosoma vivax*. The fifteenth animal was infected with *T. vivax* alone. A thorough clinical evaluation of the supposedly healthy animals revealed 5 with pyrexia and enlargement of lymph nodes but with no obvious signs of depression or loss of appetite. Their blood and lymph node smears were found positive for ECF. Of the other healthy animals, 5 were infected with *T. vivax* and 4 with *Trypanosoma congolense*, 3 of which were pyrexia.

TABLE I

Disease and haemoparasite infection status in the herd

	Parasite negative	ECF alone	ECF		<i>T. vivax</i> alone	<i>T. congolense</i> alone	Total
			+ <i>B. bigemina</i>	+ <i>T. vivax</i>			
Sick	—	11	1	2	1	—	15
Healthy 1	172	—	—	—	5	1	178
Healthy 2	—	5	—	—	—	—	5
Healthy 3	—	—	—	—	—	3	3
Total	172	16	1	2	6	4	201

Healthy 1 = Animals showing neither temperature reaction nor other clinical abnormalities.

Healthy 2 = Animals showing neither temperature reaction and enlarged lymph nodes.

Healthy 3 = Animals showing temperature reaction with no other obvious clinical abnormality.

TABLE II
Haemoparasite status in relation to type of cattle introduced in the farm

Type of animals	Fatal cases prior to the study	Parasite negative	ECF			Trypanosomes	
			alone	+ <i>B. bigemina</i>	+ <i>T. vivax</i>	<i>T. vivax</i>	<i>T. congolense</i>
High grade	—	55	—	—	—	2	1
F1-3	10	117	16	1	2	4	3
Total	10	172	16	1	2	6	4

Table II shows that none of the high grade animals purchased from Mbeya and Arusha had any evidence of ECF and/or other tick-borne disease. Blood and lymph node smears taken from them were all negative for the tick-transmitted parasites, although 2 were infected with *T. vivax* and one with *T. congolense*. In contrast, the 10 animals which died and all the ECF-infected animals were F1-3 animals which were trekked for either 20 or 50 km to the farm. This group of animals were being grazed alone in areas which were often trespassed by neighbouring pastoral cattle and those destined for slaughter.

Haemoglobin and PCV values of infected animals were similar to those of apparently healthy ones. However, 2 animals infected with *T. parva* and *T. vivax* had low PCV values (data not shown).

Post-mortem findings in 3 representative dead animals included liver friability, small grey-white nodules in the renal cortex, congestion of the spleen, oedema and congestion of lungs with variable amounts of frothy discharge in respiratory airways, and petechiation of serous membranes. Macroshizonts were demonstrated in impression smears of spleens.

Records showed that animals in the herds of origin were being dipped twice a week using camphechlor (Toxaphene 75%, Sapatox) and that animals were vaccinated against foot-and-mouth disease, blackleg, hemorrhagic septicaemia and anthrax prior to transportation. Animals were inoculated with isometamidium chloride (Samorin, Rhone Merieux) within a week of arrival. All animals at the new farm were being dipped twice a week using toxaphene (diluted 1:200). However, due to improper construction of the crush leading to the dip, some of the F1-3 cattle often escaped dipping and thus, the dipping rate was not 100%. Dipping was 100% for the high grade animals, however, supposedly because they were used to handling.

DISCUSSION

Clinical, parasitological and post-mortem examination of animals suggested ECF as the main cause of clinical cases and deaths observed on the farm. ECF accounted for all 19 cases of tick-borne disease in the herd with one of them being a mixed infection of *T. parva* and *B. bigemina*.

The affected cattle were bought from within Morogoro region and trekked for either 20 or 50 km through areas being grazed by pastoral cattle which are either dipped irregularly or not at all. Pastoral cattle are not usually dipped because of lack of working dips and the reluctance by cattle owners to accept the newly introduced high rates charged per animal immersion. As a result, the number of animal immersions per year in Tanzania has significantly dropped (Kavishe, 1988), resulting in disease endemic situations characterised by high losses of calves. In

addition, the affected group was being grazed in areas which were often trespassed by pastoral cattle either from neighbouring herds or by cattle destined for markets. It was also observed that the yard and crush leading to the dip tank was not properly constructed resulting in F1-3 animals escaping dipping. This implied a less than 100% dipping rate of these animals. Although ECF appeared only in trekked animals it is unlikely that contact with heavily tick-infested pastures during trekking could have caused the disease because it appeared in the herd a month after the arrival of the animals. Contact after arrival with tick-infested pastures because of trespassing pastoral animals and improper dipping of the F1-3 animals were probably the major factors responsible for the appearance of ECF in the herd.

Sixteen ECF-positive animals treated with both oxytetracycline and buparvaquone (Butalex, Coopers) recovered and after the proper construction of the crush, a dipping efficiency of 100% was achieved in both cattle groups. However, these recovered animals may continue to be a source of infection to ticks because they remain carriers of infection as the immunity conferred following natural disease is not sterile (Young *et al.*, 1986).

Dipping and spraying of animals with various acaricides is still the most common method of tick-borne disease control in both rural and urban animals in Tanzania. Dipping is costly and often poses health hazards to people as well as resulting in tick resistance problems (Young *et al.*, 1988). In addition the supply of acaricides in Tanzania is unreliable. Thus the evaluation of alternative disease control methods such as immunisation against ECF needs to be continued in Tanzania. Another alternative would be to use integrated methods of disease control. For instance, an integrated tick control involving use of acaricides, exclusion of wildlife, immunisation, chemotherapy and introduction of hosts resistant to ticks has been shown to be effective in studies conducted in Kenya (Young *et al.*, 1988). Thus, unless an effective disease control programme is used, ECF will continue to be a major threat to increased animal productivity in Tanzania.

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LA THEILERIOSE, FREIN PERMANENT A L'AMELIORATION DU BETAIL EN TANZANIE:
ETUDE DE CAS

Résumé—Une recherche a été menée pour déterminer la cause de mortalité dans un élevage laitier de 211 animaux récemment installé. L'examen clinique a montré que 14 des 15 animaux malades présentaient de la dépression, de la pyrexie, de l'anorexie, de la détresse respiratoire à des degrés variables ainsi que des nodules lymphatiques étendus. Ces signes cliniques étaient révélateurs d'une theileriose, qui a été confirmée par la mise en évidence de piroplasmes et de macroschizontes dans le sang et les frottis de nodules lymphatiques et par l'autopsie. Les parasites ont également été démontrés dans les prélèvements réalisés sur cinq autres animaux qui étaient pyrexiques et avaient des nodules lymphatiques étendus. L'enquête épidémiologique a révélé que l'apparition de la maladie était associée au contact avec des pâturages infectés de tiques et une lutte insatisfaisante contre les tiques causée par un bain acaricide inefficace pour le troupeau. L'infestation accrue par les tiques de pâturages en rotation était due à leur usage par des troupeaux de bovins rarement traités au bain détiqueur. En conclusion, si une lutte efficace contre la maladie n'est pas entreprise, la theileriose restera la maladie des bovins la plus mortelle en Tanzanie.

FIEBRE DE LA COSTA ESTE COMO UNA CONTINUA RESTRICCION PARA EL
MEJORAMIENTO DEL GANADO EN TANZANIA: UN ESTUDIO DE CASO

Resumen—Se realizó una investigación para elucidar la causa de muertes en una lechería recientemente establecida, con un número de 211 animales. El examen clínico reveló que 14 de 15 animales enfermos estaban deprimidos, con fiebre, anorexia, dificultad respiratoria y adenitis. Los signos clínicos fueron sospechosos de Fiebre de la costa Este (FCE). Esto se comprobó mediante la demostración de piroplasmas y macroesquizontes en la sangre, ganglios linfáticos y examen postmortem. Los parásitos también se encontraron en frotis de otros cinco animales que tenían piroxemia y adenitis. La investigación epidemiológica demostró que la enfermedad se debía al contacto del ganado con pasturas infestadas de garrapatas, y a baños acaricidas deficientes. La contaminación de las pasturas se debió a su uso por ganado comunal que no es bañado con frecuencia. Se concluye que si no se toman medidas drásticas de control, la FCE continuará siendo una de las peores enfermedades mortales para la ganadería de Tanzania.