ONCHOCERCA GUTTUROSA IN TANZANIAN CATTLE

Its prevalence and distribution in North-Eastern Tanzania

by

G.L. Mwaiko

Institute of Malaria and Vector-Borne Diseases, Amani, Tanzania.

SUMMARY

The frequency of infestation with *Onchocerca gutturosa* and the distribution of *onchocerciasis* in cattle in Tanzania was studied. In some areas 33.3% of heads was affected. The study was conducted using the skin snip method, examination of *ligamentum nuchae* and of other internal organs of cattle. The role of *Simulium vorax* and *Simulium nyasalandicum* (Amani form) in transmitting the larvae of *O. gutturosa* and *O. volvulus* has been discussed. The different biting sites for each of these species have been described and the preventive measures against human as well as animal *Onchocerciasis* suggested.

INTRODUCTION

Onchocerca gutturosa is known to affect cattle in both the temperate and tropical regions (Clarkson, 1964 and Raybould, 1972). Adult worms are normally found aroun *ligamentum nuchae*, in the neck and in the space between the spleen and rumen of infes ted cattle, with varying position depending upon the strain of the parasite (Raybould 1972).

The presence of this disease in Tanzania was first reported by Wegesa (1965) who did find that 51.3% (19 out of 37) of Masai cattle slaughtered at Monga near Amani were infected by *O. gutturosa*. Raybould's (1972) studies have shown even higher percentage of infected cattle (66.3%) (118 out of 177). This was in spite of the absence of the Simulids (due to the dry season) in the location from which the affected cattl have come from (Kibaya in Masailand).

The present report describes further investigations on the prevalence of *O. gutturosa* at the abbatoirs of Monga at Amani, Korogwe, Muheza and Tanga on the foothills of Eastern Usambara Mountains, and among cattle which were on market at Korogwe. The distribution of microfilariae in an infected animal is also given.

MATERIAL AND METHODS

Ligamenta nucharum were collected from abbattoirs in Monga, Muheza, Korogwe and Tanga. Collection from each abbatoir was made twice a week for a period of almost two

years. *Ligamenta nucharum* found with the adult *O. gutturosa* were placed in polythene bags, kept initially in a thermos flask containing ice, and then stored at -20°C.

Cattle sold at Korogwe were grouped according to their origin. Skin snips of approximately 4 mm in diameter were taken from smooth inner anterior sides or the pinnae of each cow, and kept in a drop of normal saline on the microscope slides. The skin snips were then teased with dissecting needles and left for 2-3 minutes. Finally they were examined with a "Leitz" binocular dissecting microscope at 40x.

A cow that showed the highest average number of microfilariae per skin snip was brought to Amani, and slaughtered. *Ligamentum nuchae*, surfaces of the spleen and of rumen and the region between these organs were also examined. The carcass was shaved on the neck, and umbilical regions and then the skin samples (5 samples from each region) taken with a corkborer of 1.5 cm in diameter.

RESULTS

The number of cattle slaughtered and the frequencies of infestation as shown by the presence of the adult *O. gutturosa* in the *ligamentum nuchae* are indicated (Table 1). Monga abbatoir had the highest frequency of cattle infected. Then followed Korogwe, Muheza and Tanga. Monga is located eight kilometres from Amani in the heart of Eastern Usambara Mountains, while Korogwe lies southwards, on the foothills of the Eastern Usambara, and Muheza and Tanga lie eastwards.

TABLE 1

Numbers and % of cattle infected with *O. gutturosa*

Abbatoir	No. of cows slaughtered	No. of cows with *O. gutturosa*	Frequency of infectation in %
Monga (Amani)	156 *	52	33.3
Korogwe	360	115	31.9
Muheza	180	17	9.4
Tanga	210	28	13.3

* 18 of these cattle were also positive by skin snip method on inner side of the pinnae
1 individual was also positive by skin snip method on the umbilical region.

Out of 198 cattle examined by skin snip method, 6 (3.0%) were found positive (Table 2), with microfilariae range of 3-100 per skin snip. The cattle originated from Mbulu in Arusha Region, and Lushoto in the Western Usambara Mountains, Tanga Region. A cow with an average of 98 microfilariae per skin snip was selected for further investigations. This cow, however, had microfilariae localized in the ear region only. Therefore emphasis was laid on feeding *S. vorax* (Mwaiko, 1978), which bites ears of cattle, besides *S. nyasalandicum* (Amani form) which at Amani also bites cattle, but only on the ventral surface of the thorax and abdomen (Raybould, 1972).

TABLE 2

Cattle infected with *O. gutturosa* examined by skin snip method

Origin	No. examined	No. positive	% positive
Mbulu	105	1	0.9
Lushoto	93	5	5.3
Total	198	6	3.0

DISCUSSION

Wegesa (1967) reported much higher infestation rate than that recorded here. He found 67.0% of cattle from Kibaya infected. The *ligamentum nuchae* is a regular source for adult microfilariae of *O. gutturosa*. The microfilariae collected from this site were subsequently used for the *in-vitro* maintenance studies (Mwaiko et al, 1976) and for obtaining the adult worms as a source of antigen for immunoserological studies in people affected by *Onchocerca volvulus* (Wagesa, 1968 and Mwaiko et al, 1977).

Cattle slaughtered at Monga and Korogwe were more infected than those at Muheza and Tanga (Table 1). Those slaughtered at Monga come from Korogwe. Difficulties in tracing the origin of the slaughtered cattle, make the finding of the areas in which the infestation occurs difficult. Skins snip examination of cattle, which were on sale at Korogwe revealed that the batch, which did come from Lushoto was infected to a higher degree than that from Mbulu (Table 2). It is difficult, or much too early, to conclude that the disease could be predominant in the above areas as neither detailed examination of cattle nor possible vectors of *Onchocerciasis* in this two localities were studied.

In Europe, infected cattle are generally found in those farms which are situated close to the rivers (Kolstrup, 1975). Although Lushoto has rivers which could be favourable for the development of Simulids, only two *Simulium* species have been reported there so far: *S. woodi* a vector for *O. volvulus* in Tewe (Wegesa, 1969) and a small

number of *S. neavei* complex, the latter are biting man and were collected near Mtalo (Raybould, 1966). Mbulu and Kibaya have no streams of water nearby. Sales of cattle in these areas are governed by nomadic Masai's and so cattle sold at Mbulu and Lushoto might have been infected during their travels elsewhere. This was also suggested by Raybould (1972).

Eichler and Nelson (1971) found that irrespective of the distribution of the adult worms in the infected cow the microfilariae of *O. gutturosa* were always concentrated in the skin around the umbilicus and considered that it was because *S. ornatum* bites preferentially at this region.

Cattle in the Eastern Usambara Mountains are exposed to numerous bites of *S. vorax* and *S. nyasalandicum* (Amani form). As pointed out earlier these two species have different biting sites. The former bites on the ears, while the latter bites on the ventral surface of the thorax and abdomen. *S. vorax* which has collected microfilariae from ears of an infected cow (Mwaiko, 1978) can transmit microfilariae, at the infective stage, to another cow, also through biting the ears. However, a small number of cattle slaughtered at Monga was found to have microfilariae in the umbilical region also (Table 1). This indicates also the possibility of *S. nyasalandicum* (Amani form) being another vector of the disease. Moreover there is evidence that *S. nyasalandicum* is wider spread in Tanzania. Apart from the Eastern Usambaras, larvae of this species were also found in Usa river near Arusha, and in the South Pare Mountains (Kiberege) (Raybould, 1966). Cattle are kept in all these areas. *S. vorax* and *S. nyasalandicum* (Amani form) are zoophilic. Occasionally they bite man when he is found in the proximity to cattle (Raybould, 1967, Wegesa, 1970). It was also shown that *O. volvulus* could develop infective stage in these two species of flies (Wegesa, 1967, 1970). As has already been pointed out (Mwaiko, 1978) there is a possibility in areas where *O. volvulus* and *O. gutturosa* co-exist, though in different hosts, man and cattle respectively, of the two species being transmitted by a common vector. It is therefore of considerable importance to continue checking for *O. gutturosa* in cattle in all localities where the presence of *O. volvulus* has been established. This should be one of the most important measures, allowing for the efficient prevention of this disease in man.

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