OBSERVATIONS ON BOVINE CYSTICERCOSIS AT THE DODOMA AND MPWAPWA ABATTOIRS, TANZANIA

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SUMMARY

Using data from abattoir surveys, the condemnation rates due to detection of *Cysticercus bovis* in cattle slaughtered in Mpwapwa and Dodoma District Abattoirs between 1979 and 1982, showed little difference of incidence rates between the two districts and also between the years. There were low condemnation rates and for whole carcasses was in the range of 0.45% and 0.57% in 1979 for Dodoma and Mpwapwa, respectively, while in 1981 it was 0.47% and 0.51% in Dodoma and Mpwapwa respectively. There was an increase to 1.29% in 1982 Mpwapwa. The overall condemnation rate in a 4 year period (1979-1982) was 0.56% for whole carcasses, 0.43% for hearts, 0.17% for livers, 0.08% for heads and 0.18% for tongues out of 40,655 cattle slaughtered and inspected. Low condemnation rates may be due to effects of local climate on viability of *Taenia saginata* eggs, but even the management of livestock as well as thoroughness of meat inspection may be of importance in this respect.

INTRODUCTION

The anthropozoonotic nature of taeniasis and cysticercosis was described for the first time by Kuchemeister in 1853 (cit. Kean *et al.*,) and later experimentally confirmed by Oliver in 1869 ibid.

The beef tapeworm, *Taenia saginata* is an obligate parasite, of which the adult tapeworm lives in the small intestine of man. It can live there almost indefinitely continuing to produce eggs without doing much harm to the host. When passed in human faeces the eggs are immediately infective to the bovine intermediate host. The egg is hatched in the bovine intestine, the oncosphere migrates via the blood stream and eventually forms a cystic larva stage called *Cysticercus bovis* in the striated muscles and, on rare occasions, the liver. Man is infected through ingestion of raw beef containing cysticerci.

This life cycle is important in epidemiological studies of taeniasis/cysticercosis. Many authors have incriminated various sources of infection to cattle. In endemic areas like East Africa, Urquhart (1961) found that milk was the source of infection to dairy calves when bucket fed by infected handlers. Pastures, feeds and water contaminated with human slurry and faeces containing eggs of *T. saginata* have been the sources of infection to beef cattle on ranges and feedlots (Mac Pherson *et al*, 1978). Blazek *et al* (1982) established intrauterine infection in calves.

This paper discusses and relates the occurrence of bovine cysticercosis in Mpwapwa and Dodoma Districts and Dodoma Region to the mode of transmission of *T. saginata* eggs, the influence of local climate on infectivity of taennid eggs, traditional livestock managemental practices and finally thoroughness of inspection of the carcasses for *C. bovis*. The study covers a 4-year period (1979-1982) in which urban abattoirs records on meat inspection and condemnation were analysed.

MATERIALS AND METHODS

Mature cattle purchased from village markets were slaughtered in the urban abattoirs and the carcasses were examined for *Cysticercus bovis* by inspection of the incised masseters, triceps, tongue and of the surface of offals, especially the heart and liver. From records on total slaughter and condemnation, the condemnation frequencies for whole carcasses and various parts were calculated, see Table 1.

RESULTS

The condemnation rates of carcasses and parts recorded within each abattoir showed little

variation, but between the two abattoirs there was a considerable difference. Mpwapwa had higher condemnation rates for whole carcasses, but the final overall average condemnation rates in a 4 year period (1979-1982) for both districts was less than 1% for whole carcasses and parts (Table 1).

cattle as ineffective since the cyst were evenly distributed in the musculature. In Kenya Cheruiyot (1981) pointed to the fact that thoroughness of inspection varied among meat inspectors, and he also pointed out local climate and farming practices as possible

Table 1: Condemnation rates of whole carcasses, hearts, livers, heads and tongue due to *Cysticercus bovis* infection based on records from urban abattoirs of Dodoma and Mpwapwa during the period 1979 - 1982.

Condemnations	Districts	1979	1980	1981	1982*	4 Years Period
Total slaughtered and inspected	Dodoma	6409	8504	8929	1704	25546
	Mpwapwa	3700	4573	5516	1302	15109
% Condemned whole carcasses	Dodoma	0.45	0.41	0.47	0.00	0.42
	Mpwapwa	0.57	1.18	0.51	1.29	0.79
% Condemned hearts	Dodoma	0.27	0.58	0.84	0.88	0.61
	Mpwapwa	0.00	0.00	0.00	1.29	0.11
% Condemned livers	Dodoma	0.31	0.00	0.21	0.18	0.16
	Mpwapwa	0.00	0.00	0.00	1.97	0.17
% Condemned heads	Dodoma	0.02	0.16	0.17	0.00	0.12
	Mpwapwa	0.00	0.16	0.00	0.00	0.02
% Condemned tongues	Dodoma	0.09	0.39	0.21	0.65	0.27
	Mpwapwa	0.00	0.00	0.00	0.23	0.02

* records from part of the year only

DISCUSSION

The distribution of *T. saginata* infection in cattle in various parts of the world may vary considerably depending on various source of infection, the mode of transmission, the influences of environmental factors such as local climate, sanitary conditions and livestock managemental practices on infectivity and transmission of *T. saginata* eggs.

Variations in condemnation rates could have been due to the traditional method of meat inspection as it has also been observed by various workers. Silverman (1956) criticised the traditional procedure of meat inspection for *C. bovis* in

sources of variation of prevalence rates of bovine cysticercosis in different parts of Kenya but the overall prevalence rate in a 5 year period (1975-1979) was in the range of 14.5% in 1975 and 8.21% in 1979.

The influence of local climate on infectivity of taenid eggs have been studied by many workers. Jepsen and Roth (1952), Sweatman and Williams (1963) observed remarkable resistance of taenid eggs to various adverse weather conditions. However, Laws (1968) found that desiccating weather greatly reduced the number of viable and infective eggs. The present study covered a period of at least six months of adverse climate of hot and dry seasons which is experienced in

Dodoma region. It covers between June and November and the region may be classified as semi-arid (Kabatange *et al*, 1984). Furthermore, the traditional livestock managerial practices may also have an influence on the frequency at which bovine cysticercosis occurs in Dodoma region.

The management of livestock in Dodoma region during the dry and hot season involves trekking adult animals long distances away from villages in search of pastures and water. Such practice would tend to reduce probability of the animals becoming exposed to human faeces containing *T. saginata* eggs; furthermore, in most cases the soil is bare and becomes unfavorable for the survival of *T. saginata* eggs. Calves, on the other hand, are indiscriminately grazed around human premises where they are looked after by children, to whom they even act as playmates. Hence calves are usually more heavily exposed to *T. saginata* eggs than are adult animals.

Studies on susceptibility of different age groups to *T. saginata* infection have been undertaken by many authors. In an endemic situation, adult cattle have been found refractory to *T. saginata* infection because calves, were exposed to the infection early in life (Urquhart, 1958). Later Froyd and Round (1960) confirmed his findings after failing to establish experimental cysticercosis by oral administration of *T. saginata* eggs to adult cattle of 1½ to 5 years old Froyd (1964), further confirmed the progressive resistance of calves to *T. saginata*, infection with increasing age. In more recent studies Gallie and Sewell (1983) proved that immunity to *C. bovis* acquired by infected calves may even persist after the cysticerci have been killed by medical treatment.

In conclusion it should be noted that the abattoir survey reports have revealed relatively low frequencies of *C. bovis* infection in the slaughter stock, with little variation between the two districts. Although thoroughness in meat inspection may form an important source of variation, the remarkably lower condemnation rates of the two districts in comparison with other parts of East Africa may indicate significant differences in transmission intensity. Factors such as local climate, traditional livestock management practices and susceptibility of the hosts may have considerable effects on survival, availability of *T. saginata* eggs to the natural host and finally on the establishment of the infection in the slaughter group.

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