

# THE TAENIASIS-CYSTICERCOSIS COMPLEX IN WEST AND CENTRAL AFRICA

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**Abstract.** *Taenia solium* is present in most of the countries of West and Central Africa with the exception of strict Muslim areas, where pigs are not raised and pork is not eaten for religious reasons. Although the first reports about human and porcine cysticercosis date from the fifties, extensive surveys have only been carried out in a few countries such as Benin, Cameroon, and Togo. However, a lot of case reports and data from small scale surveys are available. Porcine cysticercosis is generally more widespread in Central than in West Africa. In several regions of Central Africa, prevalence figures in pigs of 20 to 30% (based on tongue or meat inspection) are not uncommon. In many West African countries, however, the prevalence of porcine cysticercosis is usually lower than 20% and often below 10%. There are indications that human cysticercosis is also more important in Central than in West Africa. Few data are available on human taeniasis and often no distinction is made between *T. solium* and *T. saginata*. Two large scale studies (Togo and Cameroon), in which the tapeworms were identified at the species level, revealed a percentage of about 0.1% *T. solium* carriers. Recently, an effort has been made to evaluate the economic impact of the disease in Africa. A very conservative estimate of the annual losses due to porcine cysticercosis in 10 West and Central African countries indicated that it might amount to 25 million Euro. For human cysticercosis, the financial losses are undoubtedly exceeded by the social impact of the disease, more particularly the stigmatising of epileptics in many African communities.

## INTRODUCTION

Although many countries in West and Central Africa have a predominantly Muslim population, there are still many regions where pigs are kept. According to FAO the pig population in Africa has more than doubled over last 3 decades (FAOSTAT, 2001). Large numbers of pigs are present *in situ* in Nigeria, Cameroon, Togo, Congo and Angola. Until recently, very few data were available on *Taenia solium* cysticercosis in Africa (Geerts, 1993). However, during the last decade quite a lot of studies have been carried out in several West- and Central African countries, so that the picture of the geographical distribution of taeniasis-cysticercosis in the region becomes more complete. The data presented in this review are based on published and unpublished information collected through contacts with staff of the veterinary services of the region.

## TAENIA SOLIUM TAENIASIS AND CYSTICERCOSIS IN WEST AFRICA

There are only a few countries where large-scale surveys have been done on human cysticercosis (Benin

and Togo). Data on porcine cysticercosis are available from several countries (Table 1). However, there are many countries, for which no data at all are available on the taeniasis-cysticercosis complex. In Guinea-Bissau, Liberia, and Sierra-Leone, for instance, there is no recent information on *T. solium* due to political instability over many years in these countries.

Based on the available information, we can distinguish countries with a low prevalence of *T. solium* cysticercosis (*ie* prevalence of porcine cysticercosis <5% and only few case reports of human cysticercosis) and countries which are endemic to hyperendemic (*ie* porcine cysticercosis >5% and human cysticercosis frequently observed). Table 1 summarizes the data on human and porcine cysticercosis in West Africa. Since the prevalence figures in pigs are based on tongue or meat inspection, both of which are rather insensitive techniques, it has to be assumed that these data underestimate the real situation.

Data on taeniasis are available from only a few countries. In Guinea (Conakry), 3.8% of 800 schoolchildren were found infected with *Taenia* spp (Gyorkos *et al*, 1996). In Nigeria, the prevalence of taeniasis was 8.7% in a survey of hospital patients (Onah and Chiejina, 1995). No attempt was made to differentiate *T. solium* from *T. saginata* in both countries. Dumas *et al* (1990), however, identified *T. solium* in 0.1 % of 1,170 adult people in Togo.

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Table 1  
Prevalence of porcine and human cysticercosis in West Africa.

Country	Prevalence in pigs <sup>a</sup>		Seroprevalence in man <sup>b</sup>	
	%	Reference	%	Reference
<b>Low prevalence</b>				
Burkina Faso	0.6	Coulibaly and Yameogo, 2000	CR	Preux <i>et al</i> , 1996
Ivory Coast	2.5	Mishra and N'Depo, 1978	CR	Heroin <i>et al</i> , 1972
Senegal	1.2	Deme, 2002 (pers. comm)	CR	Collomb <i>et al</i> , 1964
<b>(Hyper)endemic</b>				
Benin	ND		1.3 <sup>a</sup>	Houinato <i>et al</i> , 1998
Ghana	11.7	Permin <i>et al</i> , 1999	CR	Odamtten and Laing, 1967
Nigeria	20.5	Onah and Chiejina, 1995	ND	Onah and Chiejina, 1995
Togo	17	Dumas <i>et al</i> , 1990	2.4 <sup>c</sup>	Dumas <i>et al</i> , 1989

<sup>a</sup>meat or tongue inspection ; <sup>b</sup>antibody detection ELISA; <sup>c</sup>% of the general population ; CR: case report; ND: no data available

Table 2  
Prevalence of human and porcine cysticercosis in Central Africa.

Country	Prevalence in pigs <sup>a</sup>		Prevalence in man <sup>b</sup>	
	%	Reference	%	Reference
<b>(Hyper)endemic</b>				
Burundi	2-39	Newell <i>et al</i> , 1997	2.8	Newell <i>et al</i> , 1997
Cameroon	2-25	Zoli <i>et al</i> , 2003	0.7-4.6	Zoli <i>et al</i> , 2003a, (unpublished results)
Central African Republic	ND		2.4	Druet-Cabanac <i>et al</i> , 1999
Chad	26	Assana <i>et al</i> , 2001	ND	
DR Congo	10-30	Chartier <i>et al</i> , 1990	3 <sup>c</sup>	Fain, 1997
Rwanda	20	Thienpont <i>et al</i> , 1959	7 <sup>c</sup>	Vanderick and Mboryingabo, 1972

<sup>a</sup> meat or tongue inspection; <sup>b</sup> serology; <sup>c</sup> based on presence of cysticerci; ND: no data available

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The majority of the countries in Central Africa can be considered as endemic to hyperendemic for *T. solium*. The data for human and porcine cysticercosis are summarized in Table 2. Data on the prevalence of taeniasis are available from two countries only. In Burundi, a large survey was done in schoolchildren (n=13,841). The prevalence of *Taenia* spp was 0.22% (Newell *et al*, 1997). In Cameroon, *T. solium* was identified in 0.1% of 3,109 stool samples collected from village people (Vondou *et al*, 2002).

**ECONOMIC LOSSES DUE TO PORCINE AND  
HUMAN CYSTICERCOSIS**

Although according to the existing legislation in many African countries, cysticercotic pig carcasses should be condemned at meat inspection, this is usually not the case. Very often pig carcasses infected with cysticercosis are sold at a decreased price, varying between 25 and 50 % of the normal value. Zoli *et al* (2003a) have calculated the economic losses due to porcine cysticercosis in 10 African countries based on an average prevalence of 12% (range: 0.6-20.5), an average value of Euro 50 for an adult pig and an

estimated reduction of the value of the carcass of 30%. According to FAO (1999), the total pig population in these 10 countries (Angola, Burkina Faso, Burundi, Cameroon, Chad, DR Congo, Ghana, Nigeria, Senegal, and Togo) amounts to 13,180,000 animals. The resulting economic loss is estimated at Euro 25,201,088.

Data on the impact of cysticercosis on human health in Africa are very scarce. In Cameroon, the cost of treatment of one cysticercosis patient (wage loss not included) was estimated at Euro 260 and the total annual loss at Euro 13.5 million (Zoli *et al*, 2003a). However, the social burden of cysticercosis probably exceeds the economic impact because epilepsy, which is caused by cysticercosis in 44.6% of the cases in Cameroon (Zoli *et al*, 2003b), is considered as a contagious and/or shameful disease, which often results in failure to get married or failure to enter in any professional activity (Preux *et al*, 2000).

#### CONCLUSIONS

Although an increasing number of figures on the prevalence of taeniasis and cysticercosis due to *T. solium* have become available, data are still lacking for many countries. However, based on the available information, it is clear that cysticercosis is more important in Central than in West Africa. There is an urgent need for more recent data on both human and porcine cysticercosis in Rwanda and the DR Congo, which have long been known as hyperendemic countries (Brandt, 1997). Given the high prevalence of taeniasis and/or porcine cysticercosis in certain regions of Nigeria and Chad, surveys are needed in order to examine the prevalence of human cysticercosis in these countries. More figures from well-designed surveys on representative samples of the population are absolutely needed if we want to reliably assess the burden of *T. solium* cysticercosis in West and Central Africa.

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