

## URBAN SCHISTOSOMIASIS IN EQUATORIAL GUINEA

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Received 11 May 1992; accepted 25 April 1993

**REFERENCE:** SIMARRO (P.P.), NDONG (P.), MIR (M.) & NGUEMA (E.), 1993.— Urban schistosomiasis in Equatorial Guinea. *Research and Reviews in Parasitology*, 53 (3-4): 93-95.

**ABSTRACT:** In 1989 Equatorial Guinea was registered as an endemic country for schistosomiasis (76th). Although three species of *Schistosoma* are detected, only *S. intercalatum* transmission occurs in the country, mainly in the continental capital, Bata. A cross-sectional survey in the public and private schools of Bata has permitted us to know the parasitological prevalence of *S. intercalatum* by suburbs. A malacological study in the streams which drain in Bata has shown the existence of only one potential host for schistosomiasis: *Bulinus forskalii*. An intense man-water contact and frequent mobility of inhabitants enhances the probability of parasite dissemination throughout the country. Implementation of a control programme in Bata will help to eliminate the potential spread of schistosomiasis elsewhere in Equatorial Guinea.

**KEY WORDS:** *Schistosoma intercalatum*, *Bulinus forskalii*, urban schistosomiasis, human prevalences, Bata, Equatorial Guinea.

### INTRODUCTION

*Schistosoma intercalatum* was first diagnosed in Equatorial Guinea in 1982, thus adding this country to the list of endemic countries where schistosomiasis is manifested (76th) (WHO, 1989).

Three species of *Schistosoma* have been detected in Equatorial Guinea: *Schistosoma mansoni*, *Schistosoma haematobium* and *Schistosoma intercalatum*. However, only *S. intercalatum* transmission occurs in this country. The other two species result from some imported cases from neighbouring countries, primarily from Libreville (Gabon) (personal observation).

Schistosomiasis in Equatorial Guinea is found mainly in urban foci, Bata being the main focus (SIMARRO, SIMA & MIR, 1989).

The present study attempts to assess the epidemiological importance of this urban focus.

### MATERIAL AND METHODS

**Geographical description:** Bata, the capital of the continental part of Equatorial Guinea, has a population of 25000 inhabitants and is located on the coast of the Gulf of Guinea at the latitude of 1° 45' North and 9° 45' East. It comes within the equatorial climate zone with abundant rainfall, and two dry periods, from June to September and from December to February.

The existence of many densely populated suburbs (400 inhabitants/km<sup>2</sup>) reflects the importance of rural exodus, mainly due to students who are attracted to Bata to continue their secondary studies.

Six rivers pass through the suburbs of Bata (Fig. 1) and are implicated in the man-water contact. Their watercourses are short and in the dry season most of them are reduced to little ponds. Tap water supply is not available, so the streams are exploited for children's recreation, washing clothes and household utensils. In the dry season women fish in them using traditional methods. Some wells are used for domestic needs and by adults for bathing.

**Organisation of the parasitological survey:** The study was designed as a cross-sectional survey. It was undertaken during the 1990 school year. The survey was based on a random-cluster sampling procedure. The public and private schools of Bata were the basic sampling unit. Schools were selected at random. The chances of being selected depended on the school list. The size of the sample was calculated in the following way, taking into account three factors: the estimated prevalence of the disease (previously determined by surveys), the figure of the general population (school census), and the 95 % of probability level.

**Sample collection:** After prior contacts with education authorities, the project team visited schools and provided teachers and pupils with the necessary information to obtain their collaboration and a supply of urine and stool samples. As the laboratory is very near the schools, samples were prepared on the day of collection and no preservative was used.

**Parasitological methods:** 100 ml of urine were collected per person and 10 ml, after being homogenised, were filtered using Nytrex nylon filtration technique. Two microscopic slides (83.4 mg of stool in total) were prepared from stool specimens using the Kato-Katz technique.

**Malacological methods:** Streams were sampled from the mouth to the source towards the end of the dry season (August-September 1991). Every 100 m, one team member searched for ten minutes to collect fresh-water snails. Ecological environment and water characteristics of the sites were recorded. All snails collected were subsequently identified and examined for infection, taking into account the cercarial emergence.

### RESULTS

#### Parasitological findings

According to size and shape, only eggs of *S. intercalatum* were found in the faeces. No terminal-spined eggs were found in the urine samples.

The sample was composed of 308 individuals; its sex and age distribution is shown in Table 1. A percentage of 99% (305/308) provided urine and stool samples. Out

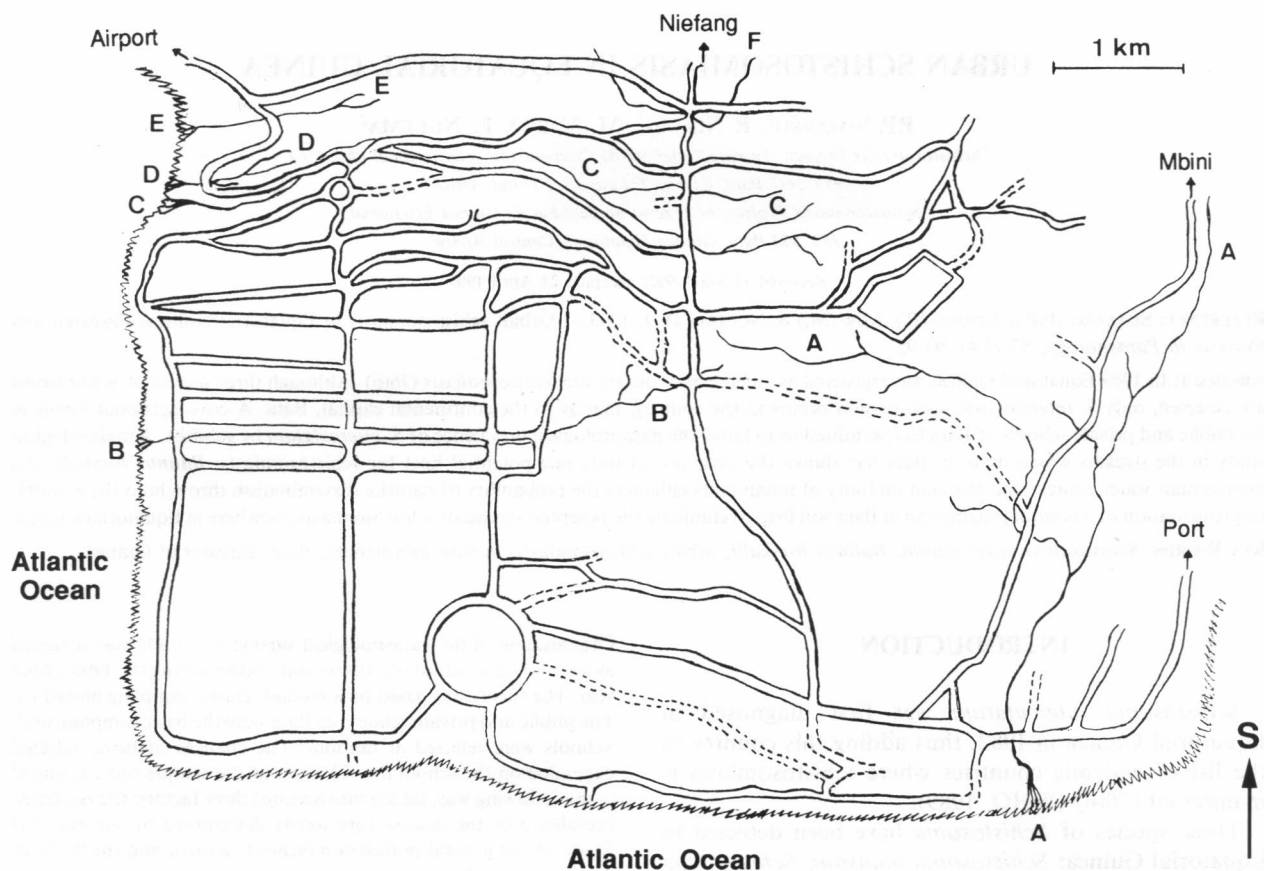


Fig. 1.— Map of the city of Bata showing the six rivers which pass through the suburbs: A=Ikunde river; B=Bata river; C=Isimbo river; D=Los Cocos river; E=Mokodua river; F=Ngolo river.

of those, 13% (39/305) excreted *S. intercalatum* eggs in the faeces.

No significant difference in prevalence was found between the sexes ( $p > 0.05$ ). Peak prevalence occurred between 5 and 14 years of age. Most of the cases were concentrated in the same age group, 9% (4/39), with the highest infection [ $< 400$  eggs per g of faeces (epg)].

Age Group	Female	Male	Total	Positive	% Prevalence
0-4	3	2	5	0	0
5-9	46	43	89	19	21
10-14	42	52	94	15	16
15-24	38	79	117	5	4
Total	129	176	305	39	13

Table 1.— Prevalence, sex and age distribution of the sample.

### Geographical distribution

Relating the positive cases with the basin of the different streams, we found that 49% (19/39) of infected persons lived in the Isimbo basin, 21% (8/39) lived in the

suburbs through which the Ikunde river runs, 13% (5/39) belonged to the Ngolo basin, 9% (4/39) to the Mokodua basin, and 8% (3/39) to the Bata river basin.

### Malacological results

A total of 174 sites were studied, corresponding to 15495 m of the six streams sampled. Only one potential molluscan host for human schistosomiasis was found: *Bulinus forskalii* (392 snails), which is the experimentally proved host for *S. intercalatum* in Equatorial Guinea (J. Jourdan, pers. comm.). No other potential snail hosts for human schistosomiasis were detected. The only other fresh water snail found was *Lanistes* ssp. Montfort, 1810 (13 snails) (Table 2).

In general positive sites for *B. forskalii* were shady places with aquatic vegetation and stagnant and biologically polluted water.

### DISCUSSION

Results obtained in this general study of schistosomiasis in the city of Bata confirm the epidemiological data reported by SIMARRO, SIMA & MIR (1990, 1991).

Stream	Length <sup>(1)</sup>	Sites	<i>B. forskalii</i>	<i>-Lanistes</i> ssp.
Bata	635	8	92	0
Los Cocos	565	4	33	0
Ngolo	515	7	0	0
Ikunde	8447	97	167	12
Isimbo	4455	57	100	1
Mokodua	878	1 <sup>(2)</sup>	0	0
Total	15495	174	392	13

Table 2.—Malacological results. (1) = in m; (2) = dried watercourse.

Although three species of *Schistosoma* are detected in travellers coming from neighbouring countries, only transmission of *S. intercalatum* has been detected. The malacological findings (only *B. forskalii* has been found in the streams of Bata) provide us with an explanation for the absence of transmission of *S. haematobium* and *S. mansoni*.

The official population of Bata is 25000 inhabitants and the school census in 1990 was 12888 students, most of whom come from every part of the country and live in the suburbs with high probabilities of being infected with *S. intercalatum*. Students return to their villages for holidays and this fact could contribute to the spreading of the parasite.

The 70% of human schistosomiasis cases in Bata are associated with the Isimbo and Ikunde streams, which pass through the very populated suburbs where neither sanitary facilities nor water supplies are available. Consequently, the man-water contact is quite intense. However, the characteristics of the streams of Bata could allow implementation of snail control activities as a

method of complementing chemotherapy and health education in the control of this urban focus, thus preventing the dissemination of the parasite to the rest of the country.

#### ACKNOWLEDGEMENTS

This study was financed by the Agencia Española de Cooperación Internacional (A.E.C.I.). The authors are grateful to the Ministerio de Sanidad de Guinea Ecuatorial for permission and support for this study. We are indebted to Dr. K.E. Mott, Chief of Schistosomiasis and Other Trematode Infections Unit from the Division of Control of Tropical Diseases (C.T.D.), W.H.O., for providing Kato-Katz kits and Nytrel filters. We also wish to acknowledge Mrs. Maria Creu for her unfailing co-operation. Thanks to Mrs. Theresa Fernandes, Mr. Fabian Ona Sima, Mr. Raimundo Nguema and Mr. Celestino Nnang for their technical assistance. Special thanks to Lucia and Diego.

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