First Report on the Presence of *Biomphalaria straminea* in the Municipality of Jaboticatubas, State of Minas Gerais, Brazil

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This is the first report on occurrence of Biomphalaria straminea *in the district of São José de Almeida (municipality of Jaboticatubas) State of Minas Gerais, Brazil. The presence of* B. glabrata *and* B. tenagophila *had already been reported in this area. Such municipality is part of the metropolitan region of Belo Horizonte and comprises 60% of the Tourist Complex of Serra do Cipó. Since the 1950s throughout the 1990s, a schistosomiasis prevalence ranging from 15 to 40% has been observed. Although no* B. straminea *specimen has been found naturally infected in the region, descendants of these snails collected in the area, showed to be experimentally susceptible to* Schistosoma mansoni *infection reaching rates from 14.6 to 28.6%. Even not being found naturally infected, in the State of Minas Gerais, the possibility that the species* B. straminea *may keep endemicity foci of schistosomiasis should be regarded, as in the Northeastern region of Brazil where the high density of this planorbid and the social-economic and sanitary conditions enable to the transmission.*

Key words: *Biomphalaria straminea* - Jaboticatubas - Minas Gerais - Brazil

In Brazil, ten species and one subspecies of the genus *Biomphalaria* are known. Among them, three species are intermediate hosts of *Schistosoma mansoni*: *B. glabrata, B. tenagophila* and *B. straminea*. Although *B. straminea* is less susceptible to *S. mansoni* infection, this species is regarded epidemiologically important in the Brazilian Northeastern region, in which it is the main responsible for schistosomiasis transmission (Paraense & Correa 1989).

Schistosomiasis is an endemic disease that has been reported in Jaboticatubas since 1950 (Pellon & Teixeira 1950), when this municipality had 1,018 inhabitants and prevalence of 36%. Since then, several investigations have been confirming high prevalence data of schistosomiasis such as 40.5% (Brener & Mourão 1956); 48.6% (Souza et al. 1988) and 15.4% (Cury et al. 1994). Massara et al. (2001) performed a parasitological survey, from feces samples, using the Kato-Katz method (Katz et al. 1972) for two slides per sample of 1180 students, from the district of São José de Almeida (municipality of Jaboticatubas), and a prevalence rate of 8.6% was observed. Further examinations on the positive students relatives showed a prevalence of 41.6%.

In 1976, Fundação Nacional de Saúde (Funasa) included Jaboticatubas in the Program of Schistosomiasis Special Control (Pece), when prevalence rates showed to be 33.5% (CDS 1976). Malacological surveys and treatment for positive schistosomiasis cases have been carried out since 1986 by Funasa. According this reports the prevalence rate of 8 communities showed to be 19.8% in 1996 and 25.5% for 35 communities in 1998. From 1999 to 2000, 59 localities were under study and a prevalence of 15.3% was found.

The current work is part of a project aimed at implanting and assessing an integrated model of schistosomiasis and intestinal helminthiasis control in Jaboticatubas. Such project includes epidemiological and malacological surveys, parasitological examinations of local students and their relatives, as well as clinical, educational and environmental control measures. This work is the first result from the malacologial survey and it is aimed at reporting the first presence of *B. straminea* in Jaboticatubas municipality and at studying susceptibility of this species to *S. mansoni*.

MATERIAL AND METHODS

Locality under study - This study was carried out in the locality of São José de Almeida, municipality of Jaboticatubas (19s31/43w44), which is part of the metropolitan region of Belo Horizonte, Minas Gerais.

Malacological survey - These surveys were performed in areas, where local schools had been previously selected for parasitological examinations including residences of positive students to schistosomiasis. The streams in the region were also investigated.

Snails - After collection, the snails were taken to the laboratory where they were measured and examined under artificial light and submitted to squeezing between glass plates. Some specimens were separated to be kept in aquarium in order to obtain descendants (F1) for susceptibility assays. Another sample of specimens was separated for morphological identification (Paraense 1975) and molecular analysis (Vidigal et al. 1998).

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Snails infection - F1 specimens of *B. straminea* were exposed to miracidia of two *S. mansoni* strains isolated in Jaboticatubas (WM and LGM) and three other strains: LE, from Belo Horizonte, MG, isolated and maintained in *B. glabrata* snails under laboratory conditions for over 30 years; SJ, from São José dos Campos, SP, obtained from naturally infected *B. tenagophila*, maintained under laboratory conditions for over 20 years and AL, from Alagoas, obtained from naturally infected *B. glabrata*, maintained under laboratory conditions for over 15 years. The techniques for obtaining miracidia are in accordance with Souza et al. (1979).

Fifty specimens of *B. straminea*, measuring 4-7 mm diameter, were used. The snails were individually exposed to 50 miracidia of each *S. mansoni* strain. For infection control, groups of *B. glabrata*, reared under laboratory conditions, with 8-10 mm diameter, were exposed to 10 miracidia/snail of each strain.

Due to the low number of miracidia obtained from human feces, it was only possible to perform infection of *B. straminea* using 10 miracidia/snail of LGM strain.

After a 30-day exposition, the snails were individually placed under artificial light and examined by stereomicroscopy. After 60 days, negative specimens were examined and submitted to squeezing between glass slides.

RESULTS

Malacological survey - Out of 6,574 snails collected in the area, 3,841 were identified as *B. straminea* and showed to be negative to *S. mansoni* cercariae. The other 2,733 were *B. glabrata* and 17 (0.6%) showed to be positive to *S. mansoni* cercariae.

Snails infection - *B. straminea* infection rates ranged from 14.6 to 28.6%, whereas for *B. glabrata* the rates varied from 45.9 to 85% (Table).

DISCUSSION

In the present study, the presence of *B. straminea* in the municipality of Jaboticatubas is first reported. The infection rates obtained here ranged from 14.6 to 28.6%, which showed to be higher than those found in literature, quite often lower than 10%, with experimental infections using several snail populations from the State of Minas Gerais (Freitas et al. 1972, Gerken et al. 1975, Souza et al. 1981a, b, 1983, Souza 1986, 1993). Souza et. al (1996), studying a *B. straminea* population from Belo Horizonte, infected 87 snails with LE *S. mansoni* strain and other 88 with VGS strain, which provided infection rates of 10.3 and 11.3%, respectively. In addition, 83 descendents of this snails were exposed to LE strain and 12% showed to be positive. Carvalho et al. (1980) reported an experimental infection rate of 12.5% for a *B. straminea* population, from Piripiri (State of Piauí), with a variable number of miracidia per snail, using *S. mansoni* SJ strain. Favre (1993) demonstrated an experimental infection rate of 0.4% in *B. straminea*, from Picos (Piauí) exposed to five miracidia/snail.

Upon analyzing available data on the snail fauna of the genus *Biomphalaria*, from the Minas Gerais, Souza et al. (2001) reported the presence of *B. straminea* in 125 among 853 municipalities, reaching the 12 mesoregions of the State. However, although no naturally infected *B. straminea* specimen has been found, up to the present moment, in Minas Gerais, this species was considered to be the main responsible for a schistosomiasis focus in Paracatu (Carvalho et al. 1987).

Even not being found naturally infected, in Minas Gerais, the possibility of the *B. straminea* may keep foci of schistosomiasis should be regarded, as in the Northeastern region of Brazil due to the social-economic and sanitary conditions, which enable transmission and a high planorbid density in water collections (Paraense & Corrêa 1989). The finding of susceptible *B. straminea*, in Jaboticatubas, mirrors its dissemination throughout Minas Gerais. Indeed, Paraense (1972, 1986) remarks that such species is widely spread in hydrographic Brazilian bays.

Thus, the finding of *B. straminea* in Jaboticatubas is an important alert, as this region is visited by tourists all over Brazil, mainly on weekends and prolonged holidays. The lack of sanitation in the area added to the fact that both tourists and local inhabitants have little information about transmission of *S. mansoni* makes the current situation worse.

Our work shows that the *B. straminea* population, from Jaboticatubas, is susceptible to *S. mansoni* infection at high rates, which in favorable conditions may become the intermediate host of *S. mansoni*.

TABLE

Infection of *Biomphalaria straminea* (F1) from São José de Almeida and *B. glabrata* with three *Schistosoma mansoni* strains, maintained under laboratory conditions, and two strains isolated from local positive inhabitants

Number of snails	Species	Diameter (mm)	*S. mansoni* strain	Number of miracidia	% of infection	% of mortality
50	*B. straminea*	4-7	SJ	50	28.6	16
-	*B. glabrata*	8-10	SJ	10	83	10
50	*B. straminea*	4-7	AL	50	18.9	26
-	*B. glabrata*	8-10	AL	10	45.9	43
50	*B. straminea*	4-7	LE	50	14.6	4
-	*B. glabrata*	8-10	LE	10	85	11
50	*B. straminea*	4-7	WM	50	26.8	18
9	*B. straminea*	4-7	LGM	10	25	11

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