

Prevalence and risk of infection by *Angiostrongylus cantonensis* in an urban population of *Rattus norvegicus*

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Urban slum environments, characterized by the lack of sanitation and inadequate infrastructure, favor the presence of synanthropic animals, such as the Norway rat, *Rattus norvegicus*. Because Norway rats are peridomestic, humans are frequently exposed to several zoonotic pathogens, usually shed by rodents, like the lungworm *Angiostrongylus cantonensis*, which can cause eosinophilic meningitis in humans. This nematode is harbored by slugs and snails as intermediate hosts, which excrete mucus with the third stage infective larvae. Rodents (and humans) are exposed after ingesting intermediate hosts or other sources of food contaminated by their mucus, completing the cycle. The aim of this study was to assess the prevalence and the risk factors associated with the probability of infection by *A. cantonensis* in a population of *R. norvegicus* within an urban slum. Tomahawk traps were used to capture individual *R. norvegicus* across 45 randomized points in an area of 0.17km<sup>2</sup>, which consists of three geographic valleys, located in the neighborhood of Pau da Lima, Salvador-Brazil. Four different campaigns were conducted during two climatic periods: two rainy seasons (March-July, 2014 (C1) and April-May, 2016 (C4)) and two dry seasons (October-December, 2014 (C2) and November-December, 2015 (C3)). Environmental surveys were also applied and daily rainfall information was recorded. Trapped rats were euthanized and fecal samples were collected and placed in 10% formalin. Fecal samples were analyzed by sedimentation to identify *A. cantonensis* larvae, which were confirmed to the species level by the observation of adult worms in rat' lungs collected during C2. During the necropsies, demographic and body condition variables of all the rats were collected. Prevalence of *A. cantonensis* was estimated for each campaign and compared using Pearson's Chi-squared test. Moreover, generalized linear models (glm) with binomial errors were developed to assess which variables among environmental (proxies for rats' and slugs'/snails' infestations), demographic (sex, age and maturity) and body condition of the rats (scaled mass index – smi, presence of fat and of wounds) were associated with the probability of infection by *A. cantonensis* in the rat population. Additionally, co-infection with other helminth species found in rat' feces was also included. Models were selected considering Akaike Information Criterion, corrected for small samples (AICc). A total of 168 Norway rats were captured, with 33% prevalence of *A. cantonensis* (no significance was found among different campaigns). Older rats or with reduced body condition were more likely to be infected with *A. cantonensis* (age: OR 1.011 95%CI 1.003 – 1.020; smi: OR 0.991 95%CI 0.984 – 0.998, respectively). Neither the environmental proxies for rat or slug/snail infestation, nor co-infection, were associated with infection by *A. cantonensis*. However, one of the best glms (delta AICc <2.00) also included the variable 'valley', suggesting differences in the distribution pattern of intermediate hosts on a local scale, which should be investigated in detail. The high prevalence of *A. cantonensis* found in this study should be used to guide prevention strategies against human infection by this lungworm.

Key-words: *Angiostrongylus cantonensis*, slugs; snails; intermediate hosts; prevalence; infectious diseases; *Rattus norvegicus*; eosinophilic meningitis.