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TITLE

ENVIRONMENTAL DRIVERS OF BIOMPHALARIA STRAMINEA POPULATION DYNAMICS IN RIVERS OF THE BRAZILIAN SEMIARID

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ABSTRACT

Some species of molluscs are of significant sanitary importance due to their role in the life cycle of trematodes that cause parasitic diseases in humans and animals, such as schistosomiasis, which is transmitted by the genus *Biomphalaria*. In Brazil, particularly in the North and Northeast regions, there are gaps in information regarding these species' ecology, distribution, and morphology. This lack of understanding of these vectors' biological and ecological aspects hinders surveillance and disease control efforts. To address these knowledge gaps, this study assessed the environmental determinants influencing the populations of *Biomphalaria straminea* in the Parnaíba River Basin, one of the main rivers in the Brazilian semi-arid region. Specimens were collected during the dry season 2022 (September and October) at three points (source, midstream, and mouth) along each of the main rivers in the basin. Samples were obtained from two types of substrates: sediment and macrophytes. The population structure was analysed based on the distribution of individuals by size classes, age, and substrate type. We modelled species abundance about environmental variables using generalised linear models (GLM), with adjustments made using a Negative Binomial error distribution. All analyses were conducted using RStudio software, utilising the *car*, *MASS*, and *stats* packages. A total of 85 individuals were collected. The Pirangi River had the highest number of specimens ($n=45$), followed by the Itauera River ($n=39$) and the Longá River ($n=1$). No individuals were recorded in the other rivers. Our model explained approximately 57% of the variation in species abundance, with higher presence in areas with elevated pH and temperature, while deeper environments had a negative influence. A total of 56 individuals were measured, of which 35 were associated with sediment and 21 with macrophytes. Although the animals found in macrophytes were slightly larger ($x=4.36 \pm 0.81$ mm) than those collected from sediment ($x=4.10 \pm 1.61$ mm), this difference was not significant. The number of young individuals was 17 times greater than that of adults in the sampled rivers. Our study demonstrated that the abundance of *Biomphalaria straminea* in the Parnaíba River Basin is strongly influenced by environmental variables, and its occurrence in different substrates highlights its adaptive capacity. The predominance of young individuals suggests that the habitats studied also function as recruitment areas, which is critical for population control strategies. These findings provide valuable insights for developing public policies aimed at surveillance and controlling schistosomiasis in the semi-arid region, contributing to improved local public health.

KEYWORDS

Caatinga; Intermediate Host; Population ecology

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