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The historic distribution of *Biomphalaria pfeifferi* and *Bulinus globosus* in the Vhembe district, Limpopo province.

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Abstract:

Schistosomiasis is a chronic and severe disease that is caused by Parasitic worms Kabuyaya et al. (2017). Freshwater snails release larvae that infect people through contact with contaminated water Moodley (2003). Intestinal schistosomiasis, *Schistosoma mansoni* is transmitted through the freshwater snail *Biomphalaria pfeifferi* and the Urogenital schistosomiasis, *Schistosoma haematobium* is transmitted through the freshwater snail *Bulinus globosus*. The freshwater snail species are distributed in the Northeast part of South Africa including the Limpopo Province Kock et al. (2004). This is due to climate variability which influences the species richness and alters the distribution patterns of the host snails and their habitat. *Biom.pfeifferi* and *Bul.globosus* have specific temperature requirements. *Biom.pfeifferi* thrives in temperatures (15-20°C) whilst on the other hand *Bul.globosus prefers a temperature range of* (20-25°C). Fluctuation outside of these ranges can impact the species distribution patterns. The climate variability of an area such as floods increases transmission by 2,8%, and prolonged drought periods, decrease transmission Mpandeli and Maponya (2013). By modelling the intermediate snails, it will be easier to identify future hotspot areas and launch local programs to intervene in the communities. This study aims to determine the historic spatial distribution of *Biom.pfeifferi* and *Bul.globosus* using climatic and bioclimatic variables. Snail habitat data were obtained from the National Freshwater Snail Collection (NFSC) for 1958-1964. Bioclimatic and climatic data were obtained from ERA5-Land monthly averaged data. Principal Component Analysis with a Pearson correlation of 0,6 to 0,85, was done to minimize multicollinearity and bias in the data. In preparation, data were analysed by ArcGIS and uploaded on the Maxent ecological niche model. The data were divided into 30% test data and 70% training data. The data were evaluated using a jackknife test and the model results were an ASC file and then uploaded on ArcGIS to produce historic maps. The preliminary results showed the Makhado municipality had the most distribution of *Biom.pfeifferi* and *Bul.globosus* snails in the Vhembe District, with the Luvuvhu River, Albasini Dam, and Klein Letaba tributary being the most important water sources. The *Biom.pfeifferi* results showed an excellent AUC value of 0,839. The high leaf area had the highest percentage contribution followed by Bio 7 (Temperature annual range) and Elevation (500-1000m). The *Bul.globosus* results showed an excellent AUC value of 0,878. The high leaf area had the highest percentage contribution followed by Bio 7 (Temperature annual range) and Bio 4 (Temperature seasonality). In conclusion, modelling will assist in displaying the data in an easily understood format as well as for further analysis statistically and spatially.

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