
Health, zoonotic pathogens and parasites

A machine learning model predicting the abundance of helminths of *Apodemus* mice in Vojvodina, Serbia

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Research on the helminth fauna of small rodents was conducted in the period from 2019 to 2023 in the territory of Vojvodina Province, Serbia, in eight different localities. The rodent sample consisted of striped field mice (*A. agrarius*) (83), yellow-necked mice (*A. flavicollis*) (116) and wood mice (*A. sylvaticus*) (43). The mice were hosts to three helminth groups: nematodes, tapeworms, and digeneans. The aim of the study was to predict the abundance of helminths of selected species of the genera *Aonchotheca*, *Heligmosmoides*, *Syphacia* and *Trichuris*, as well as species with zoonotic potential, i.e. *Rodentolepis fraterna* and *Capillaria hepatica*, based on various abiotic (Corine Land Use types, environmental variables, altitude, locality, region) and biotic (host species, sex, body mass, body length, spleen mass) factors. A random forest machine learning predictive model for factor importance evaluation was used to select and evaluate important features in predicting parasite abundance. P-values were estimated by using Monte Carlo analysis. The results showed that the prediction of the abundance of *C. hepatica* is influenced by the body condition index and spleen size of the host, and *R. fraterna* by the same two factors plus the mean monthly air temperature. The factors singled out as significant for species of the genus *Heligmosomoides* were numerous, including Corine Land Use types, all bioclimatic variables, and all biotic factors. Factors that significantly influenced the prediction of *Syphacia* and *Trichuris* species abundance were related to temperature, body condition index, and spleen mass of the host. As for *Aonchotheca* species, none of the factors were identified as significant. The obtained data are important from the aspect of using machine learning on these types of data and obtaining a better insight into parasite-host population dynamics, which is of particular importance when it comes to species that have zoonotic potential.

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