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A holistic model to assess risk factors of fasciolosis in Ankole cattle

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Contemporarily, remote sensing (RS) technology and geographical information systems (GIS) are increasingly used as tools for epidemiological studies and the control of zoonotic diseases. Fasciolosis, a zoonotic disease caused by a trematode parasite (*Fasciola* spp.), is a good candidate for the application of RS and GIS in epidemiology, strongly influenced by the habitat of the intermediate host. We examined variables which can increase the risk of fasciolosis in Ankole cattle, grazed in the degraded rangelands of north-eastern Rwanda. Risk variables considered included three environmental factors (normalized difference vegetation index, NDVI; normalized difference moisture index, NDMI; normalized difference water index, NDWI), two landscape metric variables (rangeland home-garden ratio, building density), two geological variables (percentage of poorly drained soil, elevation) and three husbandry variables (herd size, adult proportion, body condition score). *Fasciola* prevalence was used as the dependent variable, sampling season as a fixed factor and four principal components (condensed from the ten risk variables) as covariates in a univariate General Linear Model. *Fasciola* prevalence was positively correlated to rangeland proportion, cattle herd size, adult proportion and individual body condition. Moreover, high *Fasciola* prevalence was found in densely vegetated areas with high moisture (high NDVI and NDMI), in combination with large proportions of poorly drained soil at low elevations. Our study underlines the importance of 'One Health'and recommends a transdisciplinary approach for effective fasciolosis control integrating sustainable land management, enhanced livestock practices, and aims at public health interventions to mitigate the diseases'impact on animals, humans, and the environment.

Keywords

Fasciola; One Health; Environmental factors; Geographic Information System; Remote sensing

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Professional Status of the Speaker

PhD Student

Junior Scientist Status

Yes, I am a Junior Scientist.

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