

Biodiversity Affects Bovine Tuberculosis (bTB) Risk in Ethiopian Cattle: Prospects for Infectious Disease Control

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Abstract : Current theories on diversity-disease relationships describe host species diversity and species identity as important factors influencing disease risk, either diluting or amplifying disease prevalence in a community. Whereas the simple term 'diversity' embodies a set of animal community characteristics, it is not clear how different measures of species diversity are correlated with disease risk. We, therefore, tested the effects of species richness, Pielou's evenness and Shannon's diversity on bTB risk in cattle in the Afar Region and Awash National Park between November 2013 and April 2015. We also analysed the identity effect of a particular species and the effect of host habitat use overlap on bTB risk. We used the comparative intradermal tuberculin test to assess the number of bTB infected cattle. Our results suggested a dilution effect through species evenness. We found that the identity effect of greater kudu - a maintenance host - confounded the dilution effect of species diversity on bTB risk. bTB infection was positively correlated with habitat use overlap between greater kudu and cattle. Different diversity indices have to be considered together for assessing diversity-disease relationships, for understanding the underlying causal mechanisms. We posit that unpacking diversity metrics is also relevant for formulating control strategies to manage cattle in ecosystems characterized by seasonally limited resources and intense wildlife-livestock interactions.

Keywords : evenness, diversity, greater kudu, identity effect, maintenance hosts, multi-host disease ecology, habitat use overlap

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