

Bridge Hosts, A Missing Link For Disease Ecology In Multi-host SystemsAlexandre Caron¹Julien Cappelle, Graeme S. Cumming, Michel de Garine-Wichatitsky¹, Nicolas Gaidet¹CIRAD

In ecology, the grouping of species into functional groups has played a valuable role in simplifying ecological complexity. In epidemiology, further clarifications of epidemiological functions are needed: while host roles may be defined, they are often used loosely, partly because of a lack of clarity on the relationships between a host's function and its epidemiological role. Here we focus on the definition of bridge hosts and their epidemiological consequences. Bridge hosts provide a link through which pathogens can be transmitted from maintenance host populations or communities to receptive populations that people want to protect (i.e., target hosts). A bridge host should (1) be competent for the pathogen or able to mechanically transmit it; and (2) come into direct contact or share habitat with both maintenance and target populations. Demonstration of bridging requires an operational framework that integrates ecological and epidemiological approaches. We illustrate this framework using the example of the transmission of Avian Influenza Viruses across wild bird/poultry interfaces in Africa and discuss a range of other examples that demonstrate the usefulness of our definition for other multi-host systems. Bridge hosts can be particularly important for understanding and managing infectious disease dynamics in multi-host systems at wildlife/domestic/human interfaces, including emerging infections.