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Methods for studying pathogens in natural populations; recent developments and future thoughts

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Most studies on insect pathogens are within the context of insect pest control and there has, in comparison, been little research into the role that pathogens may play in regulating natural populations of insects. Studies of pathogens in natural populations present a number of methodological and sampling challenges. For example, the host range of a pathogen within a natural insect population may be difficult to define as groups of unrelated hosts may be infected. In comparison to agroecosystems there are generally a greater number of species in natural habitats making it necessary to precisely define the particular habitat a host may occupy. Host density may also be low and therefore pathogen epizootics may not occur regularly making direct observations of pathogens difficult. Sampling the habitat in these cases may be more useful in assessing the prevalence of particular pathogen groups. Sampling strategies also need to account for host phenology as pathogens may occur as low level, covert infections present in different host life stages and at different frequencies during host development. I refer to examples of methods being used in a project to assess the prevalence and distribution of UK Lepidoptera pathogens and draw on work from other research groups.