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Bifurcation analysis of an epizootiological model of avian malaria

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Avian malaria is a mosquito-borne parasitic disease of birds caused by protists of the genera *Plasmodium*, most notably *Plasmodium relictum*. This disease has been identified as a primary cause of the drastic decline and extinctions of endemic birds on Pacific Islands. In this work, we formulate an epizootiological model of the transmission dynamics of avian malaria between a generic bird species and mosquito using a system of ODEs. We derive the basic reproduction number as well as criteria for the existence and stability of disease-free and enzootic equilibria. We discuss strategies for minimizing the impact of avian malaria in two scenarios: disease-free populations which may be invaded by avian malaria and populations where this disease is enzootic but where bird species have not developed resistance.

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