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A model for malaria with ecological components

We present a model for malaria epidemics which takes into account, besides humans and anopheles mosquitoes, the existence of other mosquitoes species which are not vectors for plasmodium but which create a competition effect that can reduce the basic reproductive number. Further, we consider the occurrence of other species that can provide blood meals for mosquitoes but are immune to malaria, creating a dilution effect. These effects are meant to model observed situations in which almost no malaria cases are observed, although the anopheles mosquito is abundant.