

1109-35-173

Garrett L Otto* (glotto01@cardmail.louisville.edu), Garrett Otto c/o dept of Mathematics, University of Louisville, 328 natural sciences bldg., Louisville, KY 40292, and **Sharon Bewick, Bingtuan Li and Bill Fagan.** *Phenologically Explicit Reaction-Diffusion Model.*

We discuss a phenologically explicit reaction-diffusion model to analyze the spatial spread of an annual species. It is applicable to an insect species with three explicit life stages: adult, larval, and pupae, and a fourth implicit egg stage modeled as a time delay between oviposition and emergence as a larva. To account for the phenology (biological timing) of emergence of adults from the pupal stage and oviposition, we introduce two time dependent phenological distributions. This allows us to directly accommodate a wide variety of alternative phenologies into our model. In the case impulsive emergence, impulsive oviposition and immobile larvae we are able to find an explicit expression for the spreading speed. We offer some interpretation of the impact of phenological parameters in this case on the spreading speed. We also consider other biological scenarios, where we use numerical simulation to study the effects of phenology on spreading speed, addressing cases with emergence and oviposition windows of finite width as well as for mobile larvae. (Received January 30, 2015)