1132-35-333 **Garrett Otto** (garrett.otto@louisville.edu), Department of Mathematics, University of Louisville, Louisville, KY 40292, **Sharon Bewick** (sharon_bewick@hotmail.com), Department of Biology, University of Maryland, College Park, MD 20742, **Bingtuan Li*** (bing.li@louiville.edu), Department of Mathematics, University of Louisville, Louisville, KY 40292, and **William F Fagan** (bfagan@umd.edu), Department of Biology, University of Maryland, College Park, MD 20742. *How Phenological Variation Affects Species Spreading Speeds.*

We present a phenologically explicit reaction-diffusion model to discuss the spatial spread of a univoltine insect species. Our model assumes four explicit life stages: adult, two larval, and pupa, with a fourth, implicit, egg stage. To account for phenology (seasonal biological timing), we introduce four time dependent phenological functions describing adult emergence, oviposition and larval conversion, respectively. We show that the spreading speed of the linearized system is the same as that for non-linear system. We provide explicit formulas for the spreading speed for the cases where emergence and oviposition are impulsive, and in addition 1) larval conversion occurs at a constant rate, and larvae are immobile, 2) larval conversion occurs at a constant rate starting at a delayed time from egg hatch, and larvae are immobile, 3) larval conversion is impulsive. To consider other biological scenarios, including cases with emergence and oviposition windows of finite width as well as mobile larvae, we use numerical simulations. Our results provide a framework for understanding how phenology can interact with spatial spread to facilitate (or hinder) species expansion. (Received July 25, 2017)