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Evolution of the maturation period in insect populations

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We propose a new mathematical model to address the evolution of maturation period, building on the Nicholson's blowfly equation. First a competition model of two species is formulated as a system of nonlinear delay differential equations with two distinct delays, and we analyze its dynamics. Then we consider the evolutionary dynamics of maturation periods. For some cases, we identify the optimal maturation delay for an insect population, depending on the quality and suitability of the habitat, which is both a globally evolutionary stable and convergence stable strategy. We investigate the potential co-existence of insects with different maturation delays. Mathematically interesting questions raised by the invasibility of oscillatory insect populations. Joint work with Xingfu Zou (Western University, Canada).