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# BLOWFLY EQUATIONS: HISTORY, CURRENT RESEARCH AND OPEN PROBLEMS

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The nonlinear delay differential equation today known as Nicholson's blowfly equation was introduced in 1980 to offer an explanation for a curious dataset that had been found in experiments with a laboratory insect population. Complex dynamics arises due to the interplay of the time delay and a non-monotone feedback. In addition to being an elegant biological application, this equation has inspired the development of a large number of analytical and topological tools for infinite dimensional dynamical systems, including local and global Hopf-bifurcation analysis for delay differential equations, asymptotic analysis, stability criteria, invariant manifolds, singular perturbation techniques, invariance principles, order preserving semiflows by non-standard cones in Banach spaces, and the study of slowly and rapidly oscillatory solutions. In this talk we give an overview of these developments, and discuss three current research directions, namely

- (i) a more refined model of age-dependent intraspecific competition in pre-adult life stages and its effects on adult population dynamics;
- (ii) the effect of environmental heterogeneity on nonlinear oscillations;
- (iii) the evolution of maturation periods.

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