

# Global dynamics for a structured Nicholson's blowflies system

Teresa Faria

Departamento de Matemática and CMAF  
Faculdade de Ciências, Universidade de Lisboa, Portugal  
teresa.faria@fc.ul.pt

The celebrated scalar Nicholson's blowflies equation

$$x'(t) = -dx(t) + \beta x(t - \tau)e^{-ax(t-\tau)}, \quad (1)$$

where  $d, \beta, a, \tau > 0$ , was introduced by Gurney et al. [3] in 1980 as a model for the Australian sheep-blowfly population. Since then, it has received great attention, as it agreed with Nicholson's experimental data published in 1954. Here, we consider a generalization of (1), a Nicholson's blowflies system with patch structure and multiple discrete delays, and analyze several features of the global asymptotic behavior of its solutions. Questions of extinction versus uniform persistence of the populations are addressed. When the population uniformly persists, the existence of a unique positive equilibrium is established, as well as a sharp criterion for its absolute global asymptotic stability. This research [1,2] was partially conducted in collaboration with G. Röst (Univ. Szeged, Hungary).

1. T. Faria, Global asymptotic behaviour for a Nicholson model with patch structure and multiple delays. *Nonlinear Anal.* **74** (2011), 7033–7046.
2. T. Faria and G. Röst, Persistence, permanence and global stability for an  $n$ -dimensional Nicholson system. *J. Dyn. Diff. Equat.* **26** (2014), 723–744.
3. W.S.C. Gurney, S.P. Blythe and R.M. Nisbet, Nicholson's blowflies revisited. *Nature* **287** (1980), 17–21.