Chimeras in Fragmented Landscapes

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Wolfson Centre for Mathematical Biology &
Oxford Centre for Industrial and Applied Mathematics,
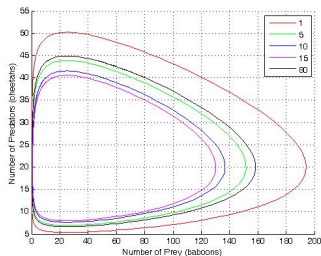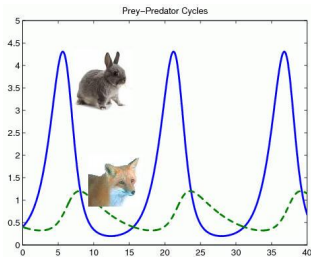Mathematical Institute, University of Oxford

20th January, 2021

Chimeras...

Chimeras in Fragmented Landscapes
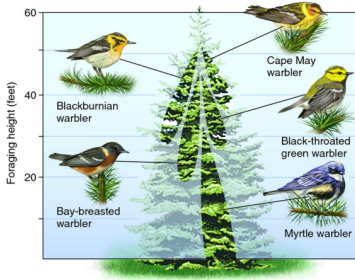
Spatially-Homogeneous Population Models

Lotka-Volterra and Structural Instability

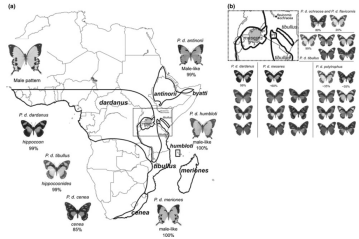$$\frac{dx}{dt} = \alpha x - \beta xy, \quad \frac{dy}{dt} = \delta xy - \gamma y.$$

Rosenzweig-MacArthur and the Atto-Fox Problem

$$\frac{dx}{dt} = rx\left(1 - \frac{x}{k}\right) - \theta\left(\frac{x}{x+a}\right)y, \quad \frac{dy}{dt} = \epsilon\theta\left(\frac{x}{x+a}\right)y + \eta\psi\left(\frac{s}{s+c}\right)y - \delta y.$$

Habitats, Niches, and Dispersal

[1] Niche Space

[2] Physical Space (Geographical Range)

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[1] https://allyouneedisbiology.wordpress.com/2016/06/11/ecological-niche/

[2] "A phylogenetic framework for wing pattern evolution in the mimetic Mocker Swallowtail Papilio dardanus" *Molecular Ecology* 18(18):3872-84, September 2009

Spatially Structured Predator-Prey-Subsidy Populations