

Accepted Manuscript

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PII: S0020-7462(17)30337-2

DOI: <http://dx.doi.org/10.1016/j.ijnonlinmec.2017.07.009>

Reference: NLM 2882

To appear in: *International Journal of Non-Linear Mechanics*

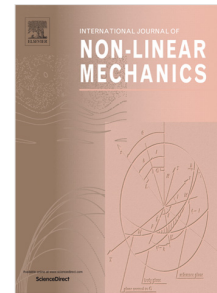
Received date: 1 May 2017

Revised date: 14 July 2017

Accepted date: 21 July 2017

Please cite this article as: F. Capone, R.D. Luca, On the nonlinear dynamics of an ecoepidemic reaction–diffusion model, *International Journal of Non-Linear Mechanics* (2017), <http://dx.doi.org/10.1016/j.ijnonlinmec.2017.07.009>

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On the nonlinear dynamics of an ecoepidemic reaction-diffusion model

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Abstract

A reaction-diffusion ecoepidemic model of predator-prey type with a transmissible disease spreading among the predator species only is considered. The longtime behaviour of solutions is analyzed and, in particular, absorbing sets in the phase space are determined. Conditions guaranteeing the non existence of non-constant equilibria have been found. Linear and non-linear stability conditions for biologically meaningful equilibria are determined.

Keywords: Ecoepidemic models, Absorbing sets, Stability

1. Introduction

Mathematical ecology has attracted - in the past as nowadays - the interest of many authors (cfr. [1]-[5]). On the other hand, epidemiology is a very important field of research, aiming at devising optimal vaccination policies to fight infectious disease (cfr. [8], [12], [15], [16], [20]-[22]). In the recent years, these two fields have merged into eco-epidemiology, aimed to model the interactions between population which host a transmissible disease. The interactions can be of competition or symbiotic type, but mainly they are supposed to be of predator-prey type (see, for instance, [9], [27]). In the most of the papers dealing with predator-prey models, the disease affects only one species and it is not transmissible to the other one. Eco-epidemic models dealing with systems in which only the prey population is affected by a disease can be found in [9], [10], [13], [19], [25] while models describing epidemics spreading among predators can be found in [11], [24], [26],

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