

DSV Seminars

2018



UNIVERSITÀ
DEGLI STUDI DI TRIESTE

DIPARTIMENTO DI
SCIENZE DELLA VITA

PhD Program in *Environmental Life Sciences*

Thursday, 22 February 2018 12:30

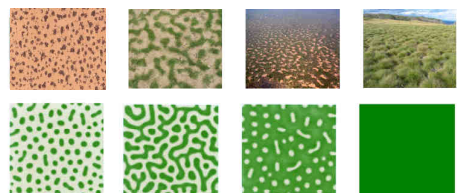
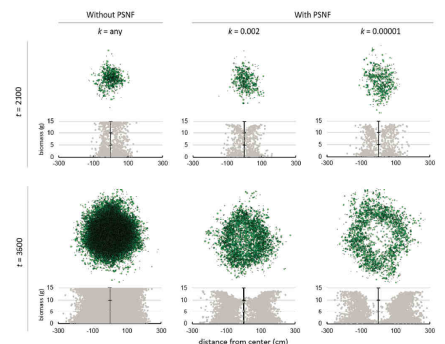
Seminar room, 1st Floor, Q Building

Francesco Giannino

Dept. of Agricultural Sciences
University of Naples Federico II
francesco.giannino@unina.it

Host: Guido Incerti

Plant-soil feedback and vegetation patterns at multiple scales



Plant Spatial patterns and self-organization of plants has been a subject of fascination because the underlying mechanisms have been hard to determine, raising different explanatory hypotheses. Plant-soil negative feedback (PSNF) - defined as the induction of negative conditions for conspecific establishment - has been widely studied in both field and laboratory conditions, and conceptually demonstrated by some modelling works.

In mathematical terms, reaction-diffusion systems which give rise to Turing instabilities have been used to model emergence of spatial vegetation patterns under different environmental conditions. Recently, the integration of different modelling approaches into hybrid modelling is the new paradigm, emerging from the integration of differential equations (ODE and/or PDE) into individual-based models (IBM), two antithetical yet complementary views of systems.

I will present a mechanistic model to explore the effects of PSNF on the spatial and temporal dynamics of virtual populations and communities of plants of diverse growth forms. Moreover, I will show different modelling approaches used to study the emergence of vegetation patterns due PSNF: from partial differential equation to hybrid models.