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Modeling the Spread of *Phytophthora*

The genus *Phytophthora de Bary* is a well-known group of fungus-like pathogens with algal relatives which are the causal agent of the most devastating plant diseases. Herbaceous crops like potatoes as well as woody crops like citrus or even trees in natural forests fall prey to them and cause tremendous pecuniary and ecological losses each year which attract a lot of interest in the investigation of the behaviour and the spread of *Phytophthora*.

We consider a model for the morphology and growth of *Phytophthora* using the example of *Phytophthora plurivora* utilizing a correlated random walk describing the density of tips. This correlated random walk incorporates some non-standard aspects, as growth and change of direction are intertwined, and the spread of newly split tips is delayed (apical dominance).

First we investigate running fronts, especially questioning the effect of this delay, for uniform- as well as non-uniform turning kernels. We find that this delay primarily influences the slope of the front and therewith the way of spatial appropriation, and not its velocity. This theoretical prediction is confirmed by experimental data of *Phytophthora* growing in Petri dishes.

The second question we are dealing within this talk is concerning the manner tips are interacting, especially the point why tips stop to grow "behind" the interface of the front, respectively in confrontation experiments at the interface between two colonies. The combination of experimental data about the spatial structured time course of the glucose concentration and simulations of a model taking into account both, tips and glucose, reveals that nutrient depletion is most likely the central mechanism of tip interaction and hyphal growth. We presume that this is the growing mechanism of this *Phytophthora* in infected plant tissue and this the pathogen will sap its hosts via energy depletion and tissue destruction in infected areas.