

## About cassava mosaic disease: modeling, analysis and simulations

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**Topic:** Biomathematics

The aim of this talk is to present recent results on the modeling, analysis and simulations of the cassava mosaic disease (CMD). Cassava has become an important staple food for over 500 millions of people in Africa, that is why protecting this crop from pest and diseases is very important. It can grow on soils with a low nutrient capacity and is tolerant to drought. Despite this, CMD is one of the most important and damaging disease. It is caused by virus that has two routes of infection: through vectors and also through infected crops. In the field, the main tool to control CMV spreading is roguing.

We have developed and studied a compartmental temporal model, taking into account the crop growth and the vector dynamics [1]. A brief qualitative analysis of the model is provided, i.e., existence and uniqueness of a solution, existence of a disease-free equilibrium and an endemic equilibrium. We also provide conditions for local (global) asymptotic stability and show that a Hopf Bifurcation may occur, for instance, when diseased plants are removed. Numerical simulations are provided to illustrate all possible behaviors.

### Reference

[1] M. Chapwanya, Y. Dumont, 2019. Application of Mathematical Epidemiology to crop vector-borne diseases. The cassava mosaic virus disease case. submitted.