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Symposium Presentation Title:

A crop simulation model to predict fruit yield and quality on mango tree: overview, progresses and perspectives

Abstract:

A crop simulation model to predict fruit yield and quality on mango tree: overview, progresses and perspectives

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Our aim is to develop a crop model for mango that synthesizes the knowledge acquired on the processes involved in fruit yield and quality development, and biotic and abiotic factors that affect them. To our knowledge, a crop model predicting fruit yield and quality development for a perennial tropical fruit crop is unique.

The crop model combines complementary phenological, architectural and eco-physiological viewpoints and relies on two sub-models developed for the cultivar Cogshall in Réunion Island.

The first sub-model accounts for carbon and water processes occurring at the branch level during the fruit growing season. It considers weather and source–sink factors and predicts fruit growth and quality development. It is currently completed with fruit maturation processes. It is also being extended to the tree scale and growing cycle by accounting for carbohydrates exchanges at these scales and through its linkage to the second sub-model. This latter accounts for architectural development and phenology. It is based on endogenous factors and temperature-controlled laws. It predicts the number and budburst date of vegetative growth units and inflorescences at the tree scale over successive growing cycles, and represents their development and growth on dynamic 3D models. The crop model will then be linked to a pests model, in particular fruit flies, through phenological stages and the level of fruit maturity.

From an applied point of view, the global model will allow simulation-based design of management solutions able to improve mango performances by handling the processes involved in fruit yield and quality development.