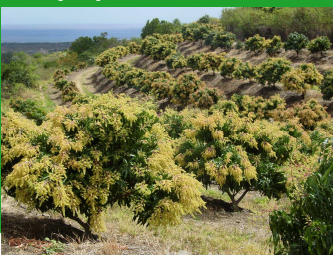


Flowering mango orchard in Réunion – F. Normand



An agroecological approach to the optimization of biological interactions & regulations in tropical horticultural cropping systems

A. RATNADASS, A. CHAILLEUX, P. DEBERDT, P. FERNANDES, I. GRECHI, M. LÉCHAUDEL, T. MARTIN, F. NORMAND, B. RHINO, P. RYCKEWAERT, J.F. VAYSSIÈRES & E. MALÉZIEUX

CIRAD, UR HortSys, F-34398 Montpellier, France

Underlying hypotheses to the approach

- certain modalities of plant species diversification in agroecosystems are conducive to natural regulation of crop pests and pathogens
- pest exclusion via physico-chemical barriers (nets) is part of the agroecological approach since it reduces adverse impacts of pesticide residues and favors pest regulation processes by natural enemies
- thorough knowledge of crop yield and quality building processes is central in view of cropping systems ecological and economic sustainability

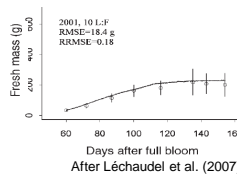
Biological models/pathways & cropping systems addressed

Plant manipulation for yield & fruit quality improvement

via endogenous and abiotic drivers applied to the **mango tree in Réunion and West Africa**, with as major expected outcome an integrated mango model for exploring tree functioning, and testing & designing crop management sequences



Mango fruiting growth unit – I. Grechi



Functional biodiversity for soil pathogen regulation

via the use of service plants applied to the **tomato crop in Martinique** to reduce populations and impact of the causative agent of bacterial wilt via direct biocidal/ allelopathic effects or via indirect effects through antagonistic soil biota and general improvement of soil biological functioning



Symptom of bacterial wilt caused by *Ralstonia solanacearum* on tomato in Martinique – P. Deberdt



Anti-arthropod barriers

via the use of insect nets applied to **leafy and fruit vegetable crops in East and West Africa**, both to reduce aerial pest impact and to increase vegetable production via microclimatic effects



Netting technology tested on tomato crops in Kenya – T. Martin

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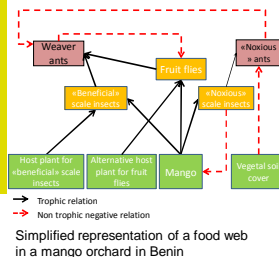
The “Airb” (Agroecological functioning, Interactions & Biological Regulations) team of the “HortSys” (Agroecological Functioning & Performances of Horticultural Cropping Systems) research unit of Cirad aims at explaining, predicting and quantifying the effects of actions on various levers at the crop plant and field level, for a better pest and pathogen control and the provision of associated ecosystem services in tropical horticultural systems. Research is conducted in cooperation with partners in the South (NARES, Universities & IARCs e.g. IITA & Icipe)

Food web optimization vis-à-vis aerial pests

via the introduction/ management of vegetal diversity and/or the manipulation of chemical cues in **mango and citrus orchards in Benin and citrus orchards in Martinique**



Weaver ants capturing mango fruit fly larvae in Benin – J.F. Vayssières

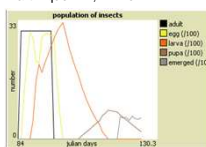


Functional biodiversity for aerial pest regulation

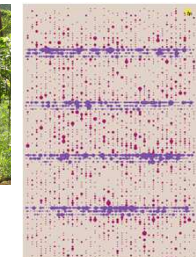
applied to the **tomato crop in Martinique** with as major expected outcome a generic spatially explicit individual-based model to optimize trap plant (e.g. sweet corn) arrangement vis-à-vis tomato in view of minimizing adverse impacts of the tomato fruit worm



Sweet corn-bordered tomato plot in Martinique – B. Rhino



Adult (left) & larva (top) of the TFW *Helicoverpa zea* – P. Ryckewaert



Temporal (left) and spatial (top) pest dynamics on a tomato plot with sweet corn interrows

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