

26-An individual-based modeling approach to assess trap cropping management of *Helicoverpa zea* in tomato field

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Farmers in the tropics are faced with crop protection issues such as adverse impacts of pesticides on human health and on the environment, particularly in intensive agrosystems in French overseas islands, or food insecurity and low income due to pest-induced crop losses, particularly in low-input traditional systems in Sub-Saharan Africa. A Cirad-funded « Omega3 » project tackles these problems by studying the effects of the planned introduction of plant species diversity (PSD) in tropical agrosystems, as a potential alternative to conventional practices based on pesticide use.

One of the several study cases the project focused on is the use of sweet corn as a trap crop to control the populations and damages of *Helicoverpa zea* in tomato field in the French West Indies (Martinique). To understand system functioning and improve *H. zea* management, we are developing a spatially-explicit individual-based model at the field scale. The model comprises 3 interacting modules that describe (i) phenology of tomato and corn plants and dynamic of the attractive plant stages for *H. zea* (ii) *H. zea* development, both using thermal units, and (iii) *H. zea* movement and oviposition behavior. More widely, we aim to use this model as a generic tool to improve our understanding of what make the use of a trap crop successful in managing pests among the insect behavioural traits, the crop traits (e.g., relative attractiveness) and the spatio-temporal planting design of the trap and commercial crops. The modeling approach we are currently developing and further issues are presented.