From Simulation Game to Early Warning System:
an interactive Agent-Based Model to fight coffee rust in Central America

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Introduction

By analyzing climatic conditions, coffee institutes issue warnings on coffee rust to producers. But due to lack of data an knowledge, they tend to systematically recommend fungicide applications, which are not affordable for small producers.

Materials/Methods

To anticipate epidemics and find prevention strategies, we designed an interactive multiplayer simulator, called "MiRoya". Based on the life cycle of rust and coffee trees, this game simulates coffee production according to climatic conditions and the treatments applied by producers. Intended for the coffee institutes, it aims at triggering debates on recommendations for small producers with limited financial resources.
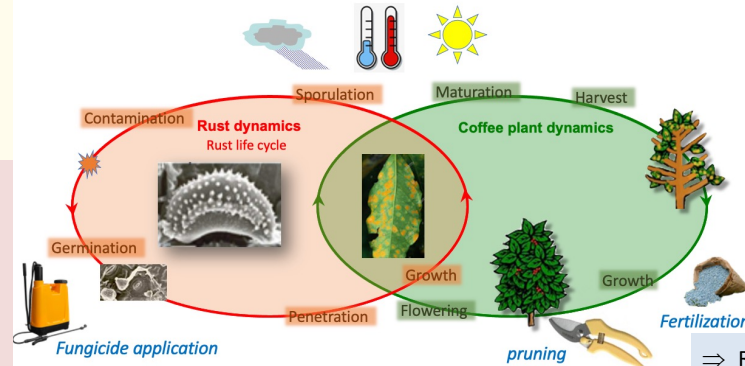

Fig. 1: Coupled dynamics = Coffee trees growth, rust life cycle, under biophysical constraints and producer actions (*in blue*)

Photo 1: two groups of players compete to find the best rust control strategy, regional workshop in Costa Rica

Results/Discussion

Sessions held in several countries in Central America showed wide disparities in results, even though the participants were experts in coffee and rust. By making them aware of the technical, economic and labor restrictions of small producers, participants realize that it is impossible to systematically apply fungicides. They are obliged to:

⇒ Rationalize their recommendations and adapt them to local conditions,
⇒ Carefully consider the timing of treatments,
⇒ This require accurate information on climate and socio-economic context

Photo 2: National workshop in El Salvador

Conclusion/Perspectives

By highlighting the <u>importance of communication between countries</u>, this game aims to
- Harmonize alert levels
- Exchange information on rust severity levels
- Structure a regional network of coffee institutes.

The ABM underlying this game is one of the central tools of a regional **E**arly **W**arning **S**ystem for coffee rust