

Soil biodiversity and ecosystem services in various agroecosystems of Guadeloupe (French West Indies).

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Outline:

1. Introduction

A. Soil and soil biodiversity

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2. The aim of the study

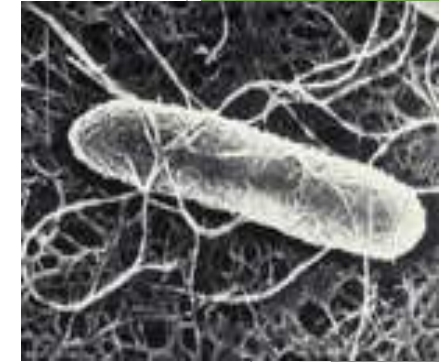
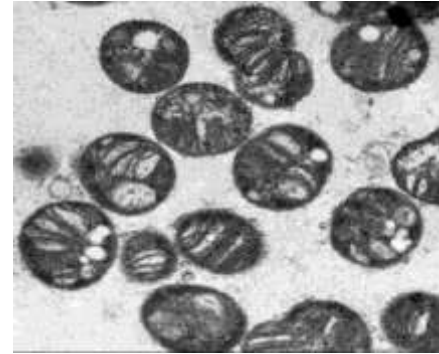
3. Biodiversity and ecosystem services in market-gardening

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A. Soil and soil biodiversity

Chemical Engineers

- ▶ Bacteria, fungi, microalgae...
- ▶ decomposition of organic matter
- ▶ the availability of plant-friendly nutrients such as nitrogen and phosphorus (Wardle, 1999; Barrios 2007; Pattison et al., 2008).



Bacteria



Fungi

Micro-predators

- ▶ Nematodes and Protozoa
- ▶ By feeding on microorganisms (bacteria and / or fungi), they regulate their activities (Deprince, 2003).



Nematodes



Protozoa

Litter transformers or Predators



Acaridae



Myriapoda



Insects and insect larvae



Oniscidea



Collembola



Acaridae predators



Pseudoscorpion



Spider

Ecosystem engineers or predators

► The ecosystem engineers (ants, termites, earthworms) have the possibility to structure physically their environment by producing biogenic structures (galleries, earthworms castings)



Chilopoda



Earthworms (Annelida Oligochaete)

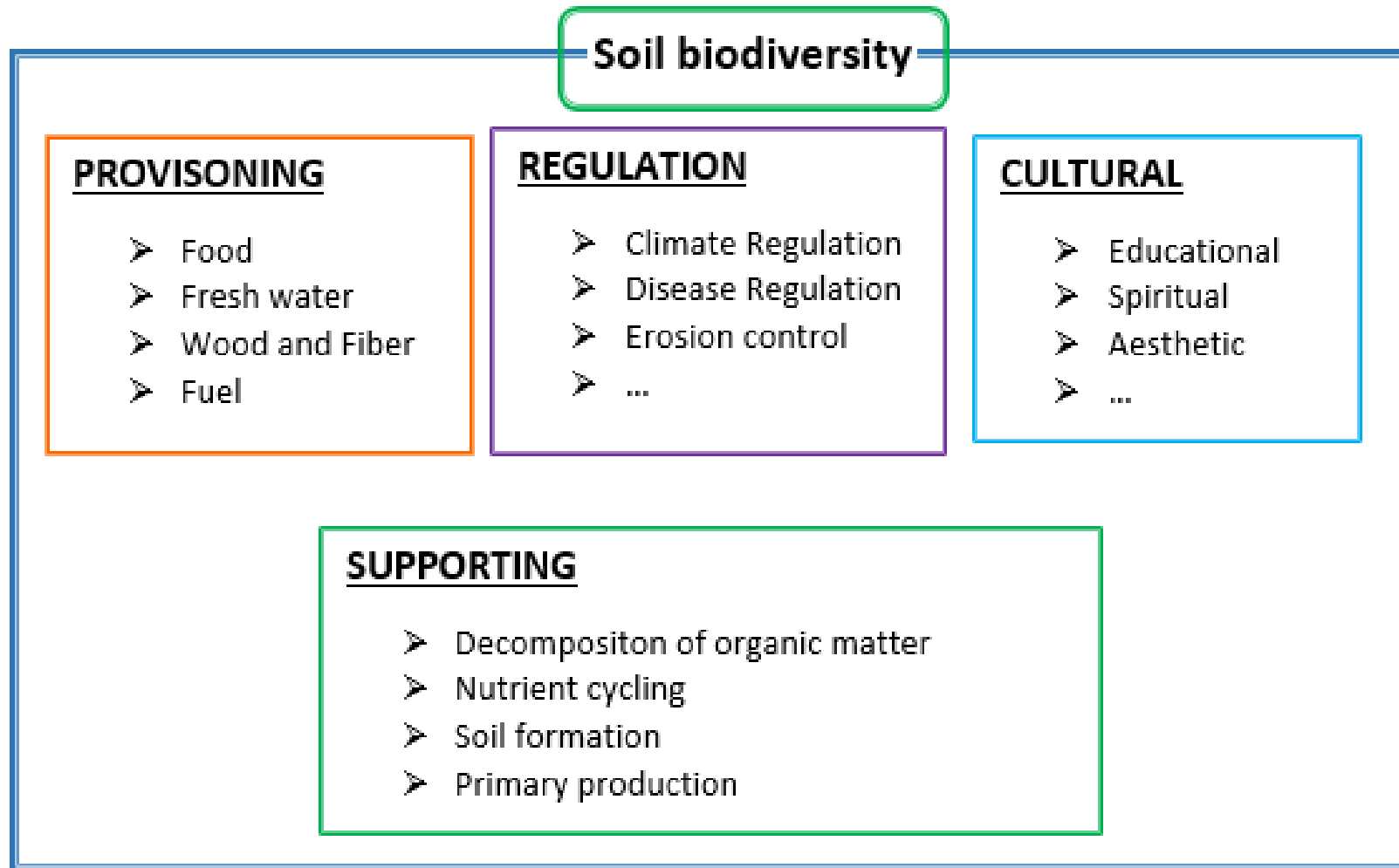


Formicidae



Isoptera (Termite)

B. Soil biodiversity and ecosystem services



- ▶ The various ecosystem services and the contribution of soil biodiversity to supply those services. (FAO, 2007 ; Turbé *et al.* 2010).

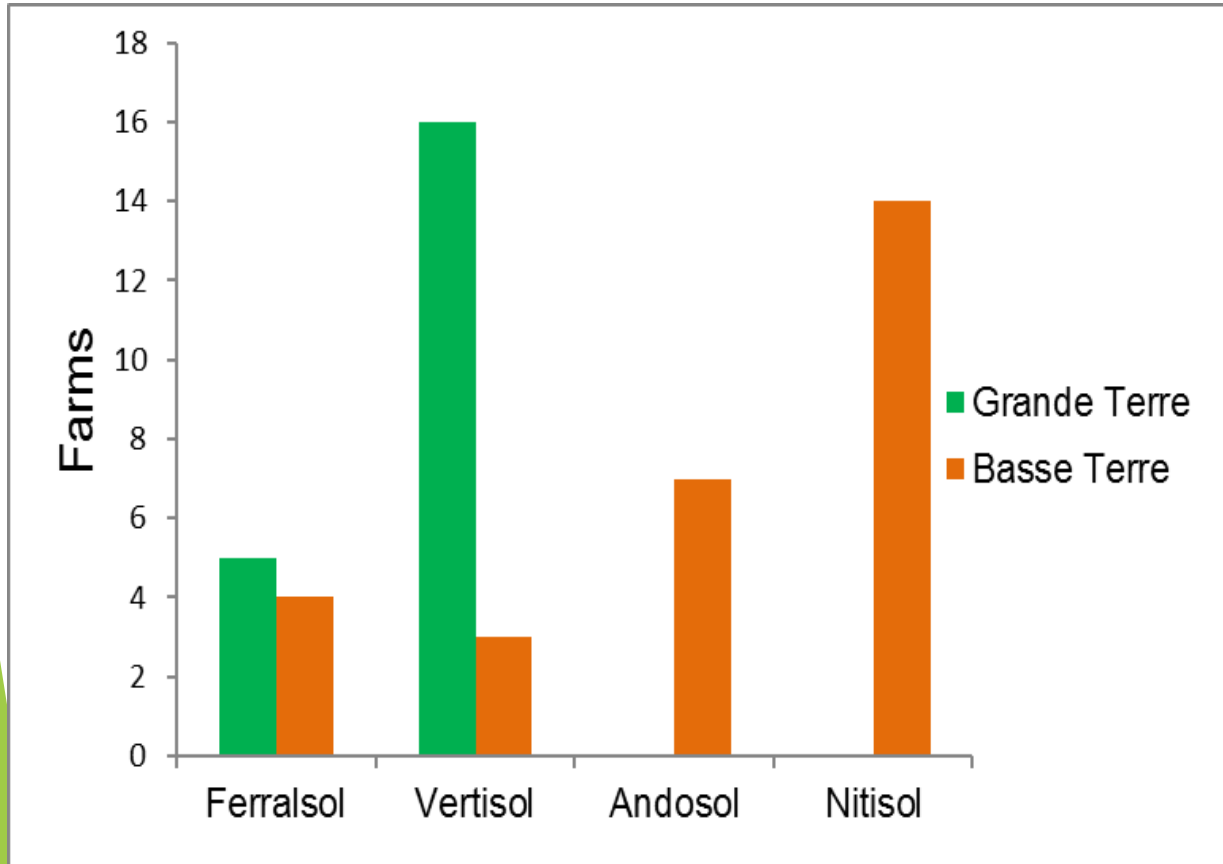
2. The aims of the study



- ▶ i) To measure the impact of agricultural practices (intensive versus agro-ecological) on soil biodiversity and ecosystem key services in market-gardening agrosystems of Guadeloupe.
- ▶ (ii) To test the impact of several agro-ecological practices based on the restoration of soil biodiversity on soil ecosystem services.

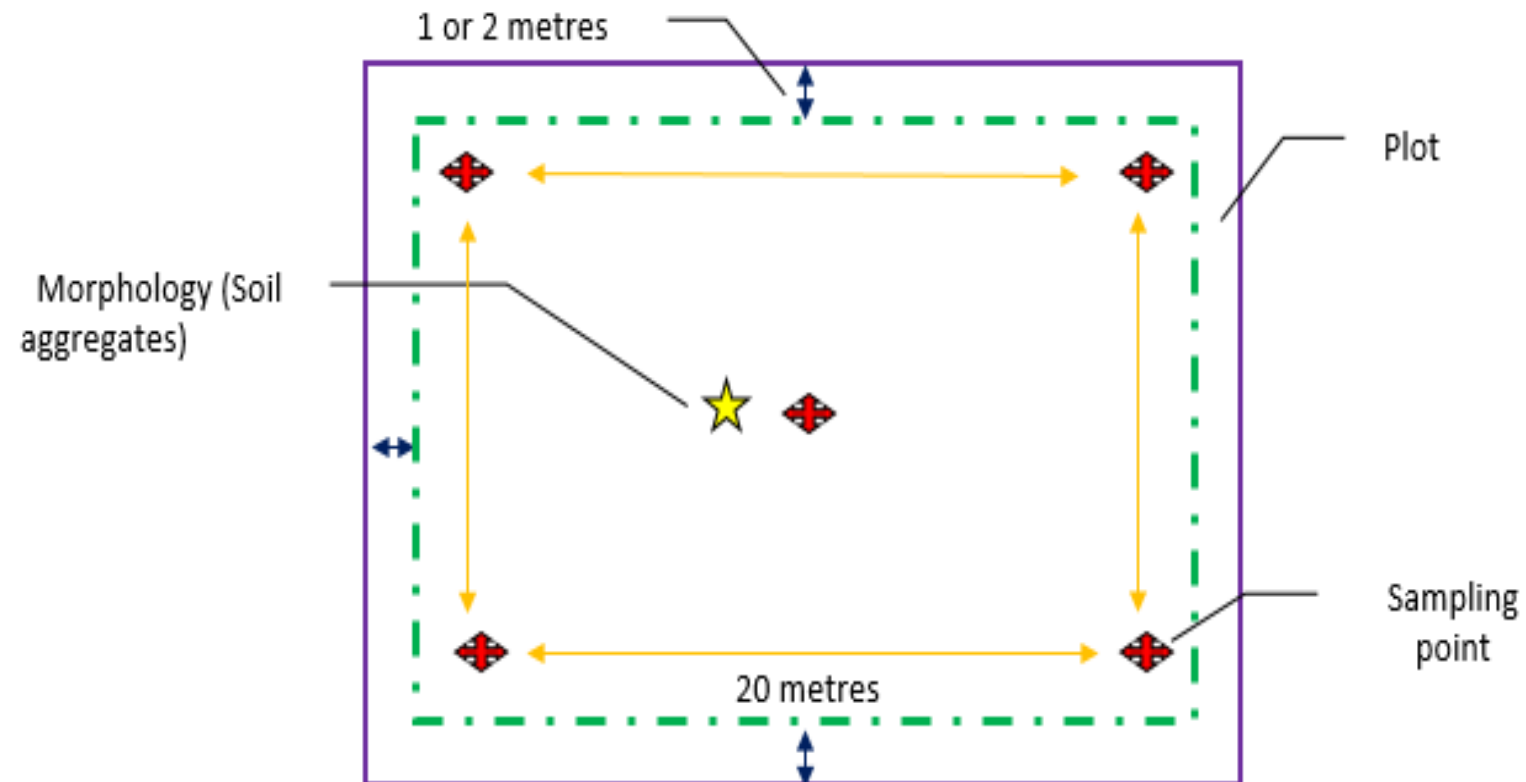
These researches will allow us to highlight the existing interactions between soil biodiversity and environmental performance in a tropical environment.

3. Biodiversity and ecosystem services in market-gardening



- ▶ Identify of the links between cropping system, physico-chemical quality of the soil and the biodiversity in divers market-gardening systems.
- ▶ We analyzed 49 plots, representing the regional diversity of market-gardening in Guadeloupe (tomatoes, cucumbers, watermelons...).
- ▶ This typology allowed a better understanding of the diversity of production systems (tillage, phytosanitary treatment, organic input, combined crops).
- ▶ This analysis highlighted a predominance of market-gardening systems in Grande-Terre (West part of Guadeloupe)

- ▶ The aim is to measure the impact of agricultural practices on soil biodiversity and ecosystemic services.
- ▶ TSBF method (Anderson & Ingram 1987)



Étape 1 - Prélevez le sol à l'aide d'un cadre de 25×25 cm de côté et 20 cm de profondeur et d'une pelle bêche.



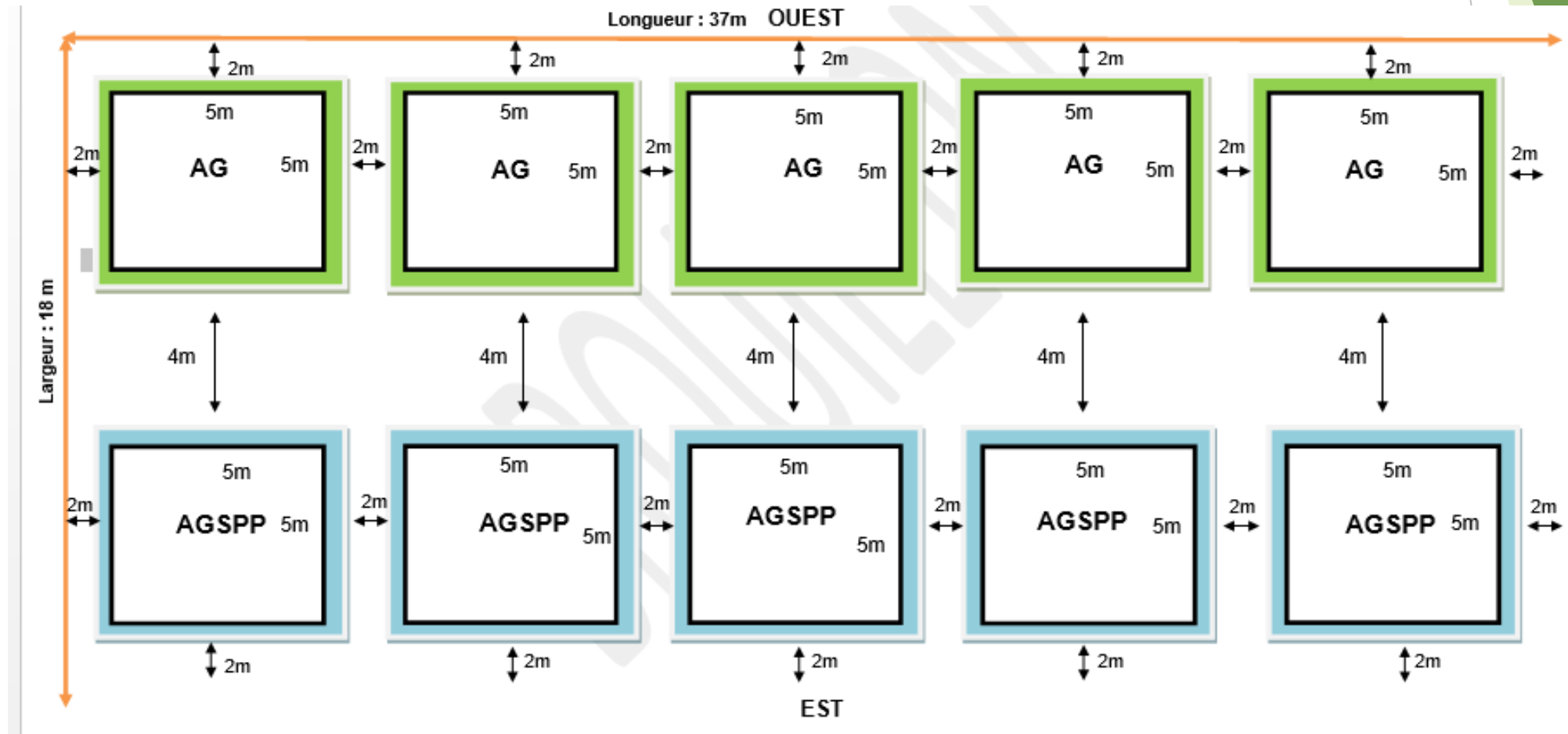
Étape 2 - Dans un bac, triez les organismes du sol visibles à l'œil nu et récupérez les dans un flacon rempli d'alcool à 70%

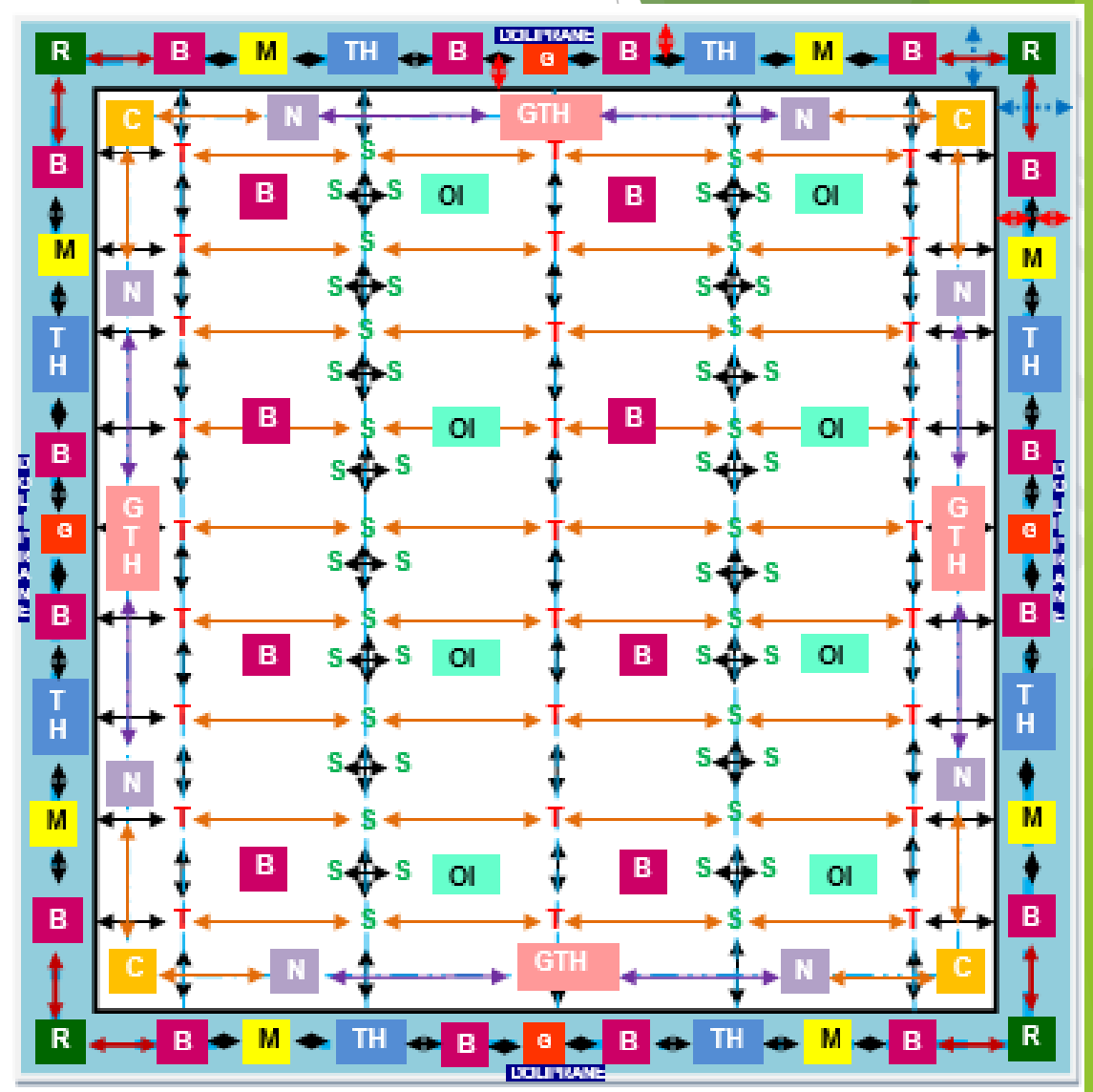
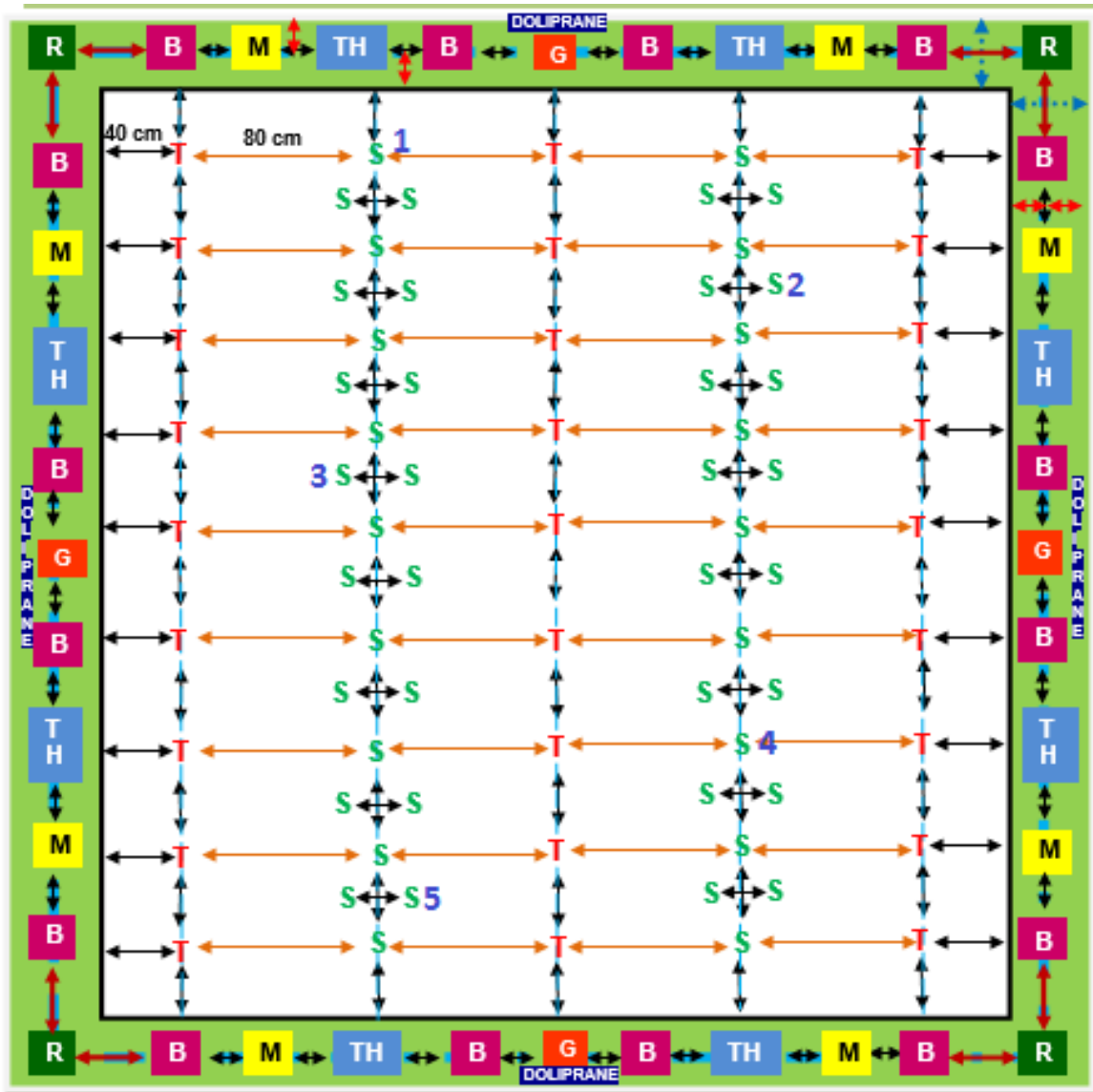


- ▶ Study on macrofauna, chemical and microbiological analyses is in progress in 10 farms (5 agroecological plots and 5 conventional plots).

4. Restoration of soil biodiversity

- ▶ To test the impact of several agro-ecological practices based on the restoration of soil biodiversity on soil ecosystem services.
- ▶ This systems was created by the cooperation of various authors (scientists, farmers, technicians).
- ▶ It started in February 2017 and it will be ending in 2018.





Acknowledges



La Fondation
de toutes les causes



Thank you for your attention