



## Collaborative platform for experimenting agroecology

### Scientific animation

- Stéphane CORDEAU, Agroecology Joint Research Unit
- Violaine DEYTIEUX, Experimental unit Domaine d'Époisses

### Research topics

- Breeding and evaluation of plant ideotypes
- Study of plant/microbe interactions
- Role of spatial processes for functional biodiversity and biological control
- Design and evaluation of agroecological systems

### Some figures

- 10 - 15 crop species
- 125 ha of experiment, including 7 ha of factorial experiment
- 10 ha of flower and grass strips
- 3.4 km of hedges
- 10 scientists and engineers
- 20 technicians

### Missions

The CA-SYS platform aims to:

- Design and evaluate **innovative agroecological systems**;
- Study the **transition** from current farming systems towards agroecological systems;
- Breed new **varieties** adapted to agroecological conditions, for example tolerant to stressors and better benefiting from beneficial plant-microbe interactions;
- Understand the **ecological processes** underlying the functioning of agroecological systems;
- Develop and adapt **experimental methods** for studying agroecological systems and produce knowledge under agroecological conditions.

### Overarching goals

**Design arable pesticide-free farming systems** by enhancing the services provided by **cultivated and wild biodiversity** to reduce the reliance on external inputs while maintaining/increasing cropping system sustainability.

**Evaluate the feasibility and performances of highly disruptive agroecological systems:**

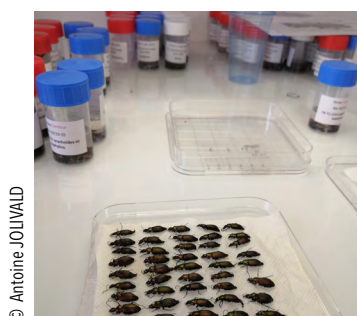
- Production of knowledge to develop these systems;
- Assessment of multiple performances (economic, social, environmental) of highly disruptive agroecological systems.

### Agroecological principles structuring the platform

- **Increasing plant diversity** in fields (mixtures of species/varieties), in time (crop succession), in space (landscape management of crops and semi-natural habitats);
- **Farming without pesticides** by combining alternative and agroecological technics for pest management;
- **Acting at the landscape scale** by designing the spatio-temporal arrangement and management of fields and semi-natural habitats (hedges, flower and grass strips).



© Mousa GARY



© Antoine JOLIVARD

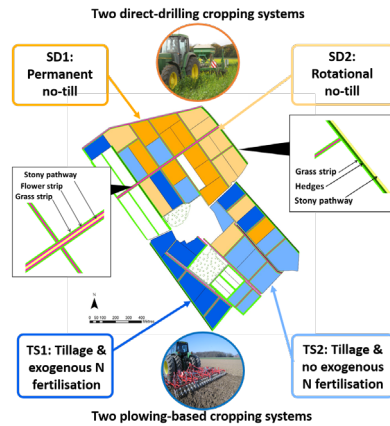


© Violaine DEYTIEUX



## Exploring a diversity of agroecological systems

Two main agricultural strategies are tested: plowing/secondary tillage-based systems (occasional plowing, false seedbed, mechanical weeding) vs. conservation tillage/agriculture systems (permanent no-till or rotational no-till).



A coherent landscape design strategy resulting in a mosaic of adjacent fields with diverse cropping systems and a network of semi-natural habitats

- Testing the effect of a homogeneous landscape **vs.** a composite landscape of farming practices on biological regulation processes

### Implementation in summer 2018

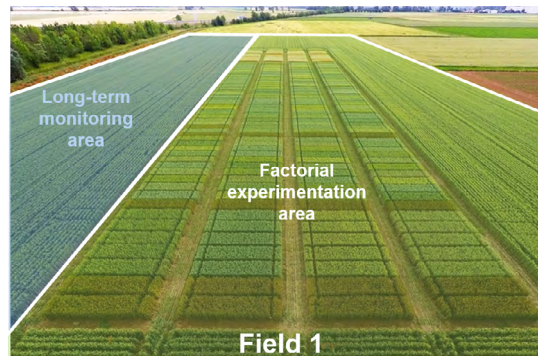
First results are under analysis. Some difficulties in the management of agroecological systems have already been identified and adaptations are necessary.

### Routinely collected data

- Farming practices
- Yield and quality
- Crop growth
- Mains pests and damages
- Weeds and yield loss
- Beneficial organisms and level of pest biocontrol
- Soil microbial diversity (and soil carbon stock in some fields)

## Renewing experimental approaches

Factorial experiments are nested in the fields dedicated to system experiment.



© Rodolphe HUGARD / Guillaume POUSSOU

- System experiment to design and evaluate agroecological systems
- Factorial experiment to better understand ecological processes (e.g. plant/beneficial microorganism interactions), or to test the effect of some practices (e.g. testing cover crop termination methods), or to breed varieties adapted to agroecological management

## Interacting with stakeholders

Farmers, advisors, technicians, engineers, teachers and researchers have been involved in the design of the platform, participating in meetings and workshops for the co-design of agroecological systems. They are still involved in the life of the platform, via workshops on specific themes or visits, to benefit from their expertise.

- Explain our agronomic logic and reasoning to manage the systems
- Discuss some adaptations, extrapolations of the results to other production situations
- Produce resources to support agroecological transition
- Communicate with farmers, students and public decision-makers



### Contacts: