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Vincent Cellier, Marie-Hélène Bernicot, Caroline Colnenne-David, Violaine Deytieux, Ségolène Plessix, Anne-Laure Toupet, Jean-Noël Aubertot

### ► **To cite this version:**

Vincent Cellier, Marie-Hélène Bernicot, Caroline Colnenne-David, Violaine Deytieux, Ségolène Plessix, et al.. A national field experiment network to analyse pesticide-free cropping systems in arable crops. IPM Innovation in Europe, Jan 2015, Poznań, Poland. , 174 p., 2015, IPM Innovation in Europe, Poznań, Poland, January 14–16, 2015, Book of Abstracts. hal-02741710

**HAL Id: hal-02741710**

**<https://hal.inrae.fr/hal-02741710>**

Submitted on 3 Jun 2020

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## A NATIONAL EXPERIMENTAL NETWORK TO ANALYSE PESTICIDE-FREE CROPPING SYSTEMS IN ARABLE CROPS

Cellier V.<sup>1</sup>, Bernicot M.H.<sup>1</sup>, Colnenne-David C.<sup>2</sup>, Deytieux V.<sup>1</sup>, Plessix S.<sup>1</sup>, Toupet A.L.<sup>1</sup>, Aubertot J.N.<sup>3</sup>

(1) INRA, UE 115 Domaine Experimental d'Epousses, F-21110 Bretenière (2) INRA, UMR 211 Agronomie, BP 1, F-78850 Thiverval Grignon (3) INRA, UMR 1248 AGIR (AGroécologies, Innovations, Ruralités), BP 52627, F-31326 Castanet Tolosan Cedex  
 Contacts: vincent.cellier@epousses.inra.fr · caroline.colnenne@grignon.inra.fr · yvonne.deytieux@epousses.inra.fr

Produce new references and knowledge useful for the design of innovative cropping systems less reliant on pesticides

- Designing and testing pesticide-free cropping systems, and assessing their agronomic, environmental and socio-economic performances
- Analysing the impact of pesticide-free cropping systems on pest populations and natural biological regulations

### Integrated Pest Management based cropping systems, designed according to a common set of constraints and objectives in a wide range of production situations

#### Constraints :

- No pesticide use (except for biopesticides)
- Cultivation of the major crops of the considered region

#### Objectives :

- To maximise, under these constraints, crop production (yield quantity) satisfying market expectations (yield quality)
- To reduce other environmental impacts such as fossil energy consumption or greenhouse gas emissions
- To maintain economic profitability for farmers

### 8 experiments with common specifications

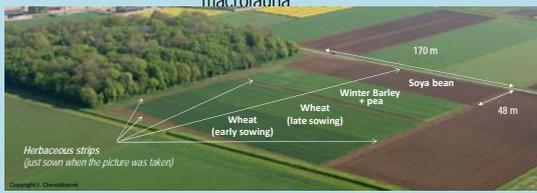
Since 2012

#### Experimental device:

- 50% of crops of the rotation are tested every year
- Minimal plot area: 0.5 ha
- At least 6-year duration to analyse cumulative effects of cropping systems
- No reference cropping system
- Setting up of landscape structures (at least an herbaceous strip)

#### A set of protocols in order to standardise data collection:

- Cropping practices
- Environment
- Crop
- Pest injury levels
- Biological regulations
- Yield and harvest quality
- Conservation of soil samples and soil macrofauna



Experimental layout for the Bretenière experiment (2012-2013)

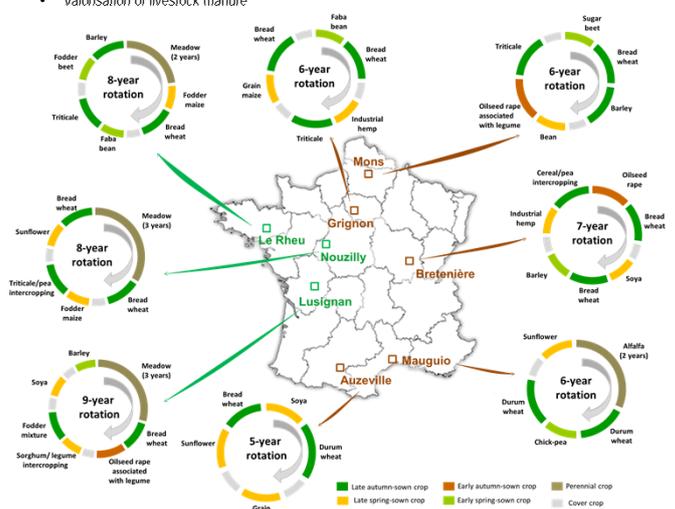
### Cropping systems adapted to the regional production situation

#### Crop-livestock farming systems

- Balance between fodder autonomy and cash crops
- Valorisation of livestock manure

#### Arable cropping systems

- Only cash crops



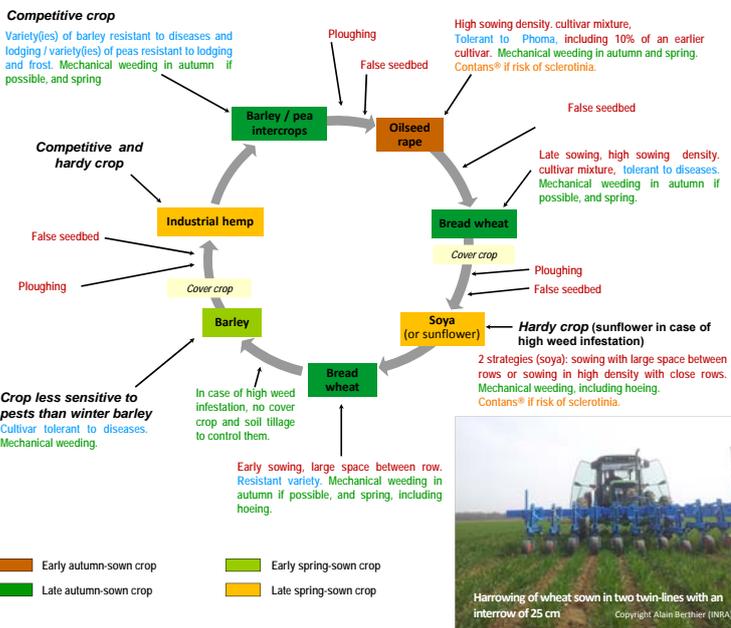
Crop sequence of pesticide free cropping systems tested on RésOpest Sites. Sites with crop-livestock farming systems are in green; sites with arable crop systems are in brown.

### Combining different techniques to limit damages caused by pests

- By reducing the risk of pest development (prophylaxis through cultural and genetic control methods)
- By favoring the implementation of biological regulations
- By using physical and biological control methods
  - At the crop and the crop sequence levels
  - By integrating field margins

### Concrete example: cropping system tested in the Bretenière experiment

(in red : cultural control ; in blue : genetic control ; in green : physical control ; in orange : biological control)



### A tool for research, enhancing interactions with agricultural development and education

#### A unique experimental tool to support innovative research programs in Agroecology

- To produce original references on pesticide-free cropping systems
- To assess the robustness of Integrated Pest Management solutions
- To analyse biological regulation services
- To identify technical barriers and research forefronts

#### In connection with other networks and partners, both at local and national levels

- Methodological exchanges on cropping system experimental approaches
- Exchanges on innovative technics
- Visit and training supports for farmers, agricultural advisers, agricultural technical institutes, agricultural cooperatives, researchers and students.

