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

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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

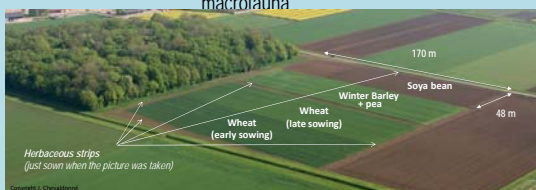
Since 2012

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



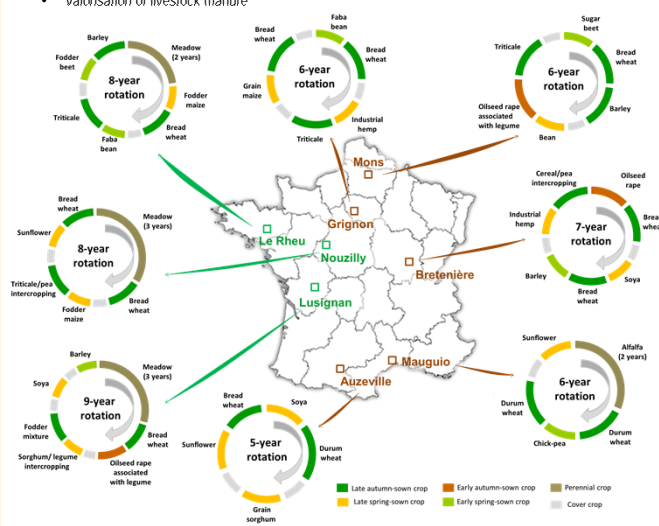
Cropping systems adapted to the regional production situation

Crop-livestock farming systems

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

Arable cropping systems

- Only cash crops



Combining different techniques to limit damages caused by pests

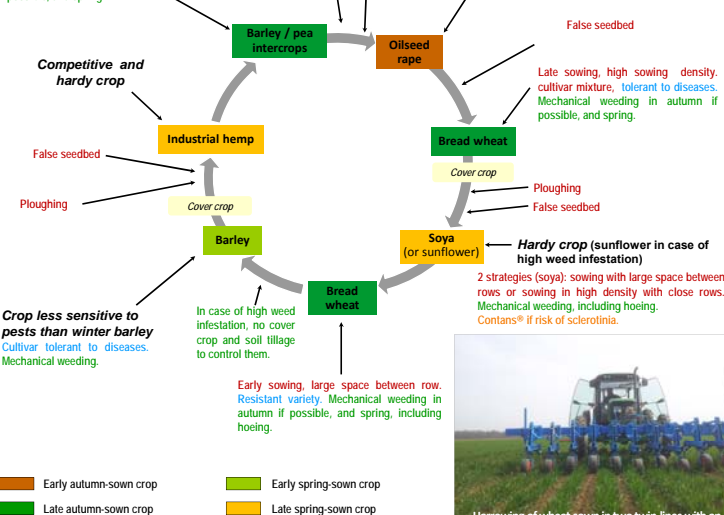
- By reducing the risk of pest development (prophylaxis through cultural and genetic control methods)
- By favoring the implementation of biological regulations
- By using physical and biological control methods
 - At the crop and the crop sequence levels
 - By integrating field margins

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)

Competitive crop

Variety(ies) of barley resistant to diseases and lodging / variety(ies) of peas resistant to lodging and frost. Mechanical weeding in autumn if possible, and spring



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 techniques
- Visit and training supports for farmers, agricultural advisers, agricultural technical institutes, agricultural cooperatives, researchers and students.

