

AN EXPERIMENTAL NETWORK TO STUDY PESTICIDE-FREE ARABLE CROPPING SYSTEMS

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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 performed with the same specifications

Since 2012

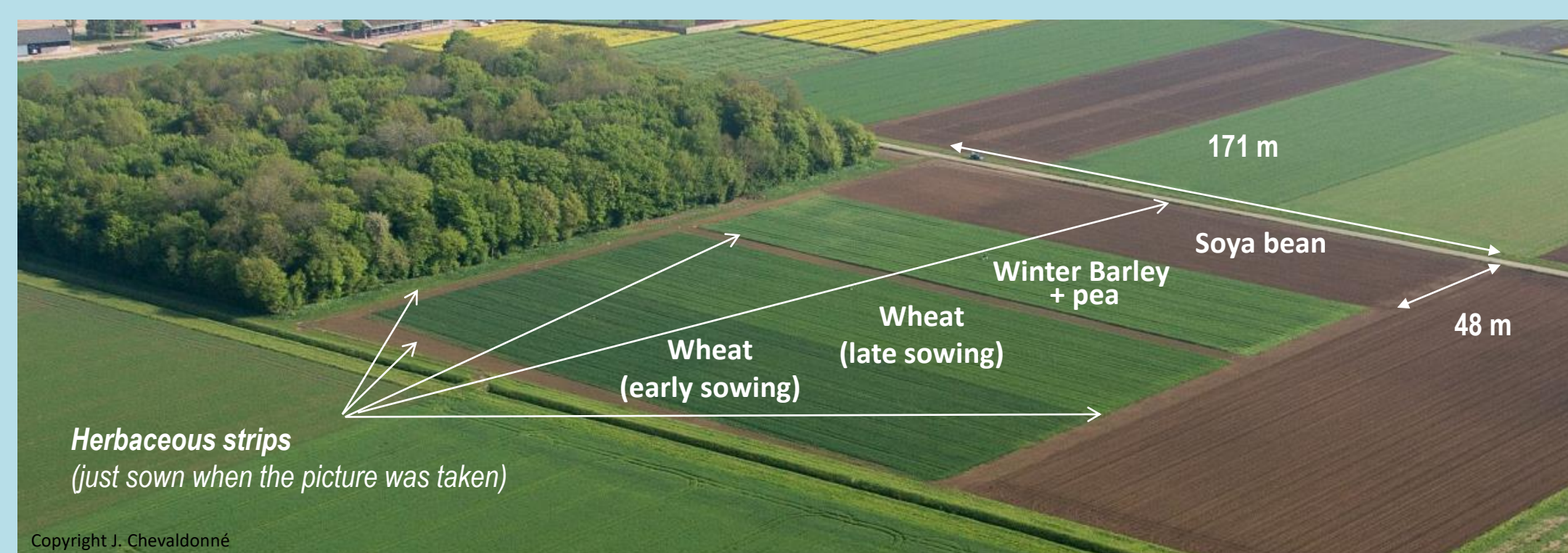
Experimental device:

- 50% of crops of the rotation are tested every year
- Minimal plot area: 0.5 ha
- At least 6-year duration to analyse long-term 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:

- Agricultural practices
- Environment
- Crop, pest injury levels
- Biological regulation
- Yield and harvest quality
- Conservation of soil samples and soil macrofauna

Experimental layout for the Bretenière experiment (2012-2013)



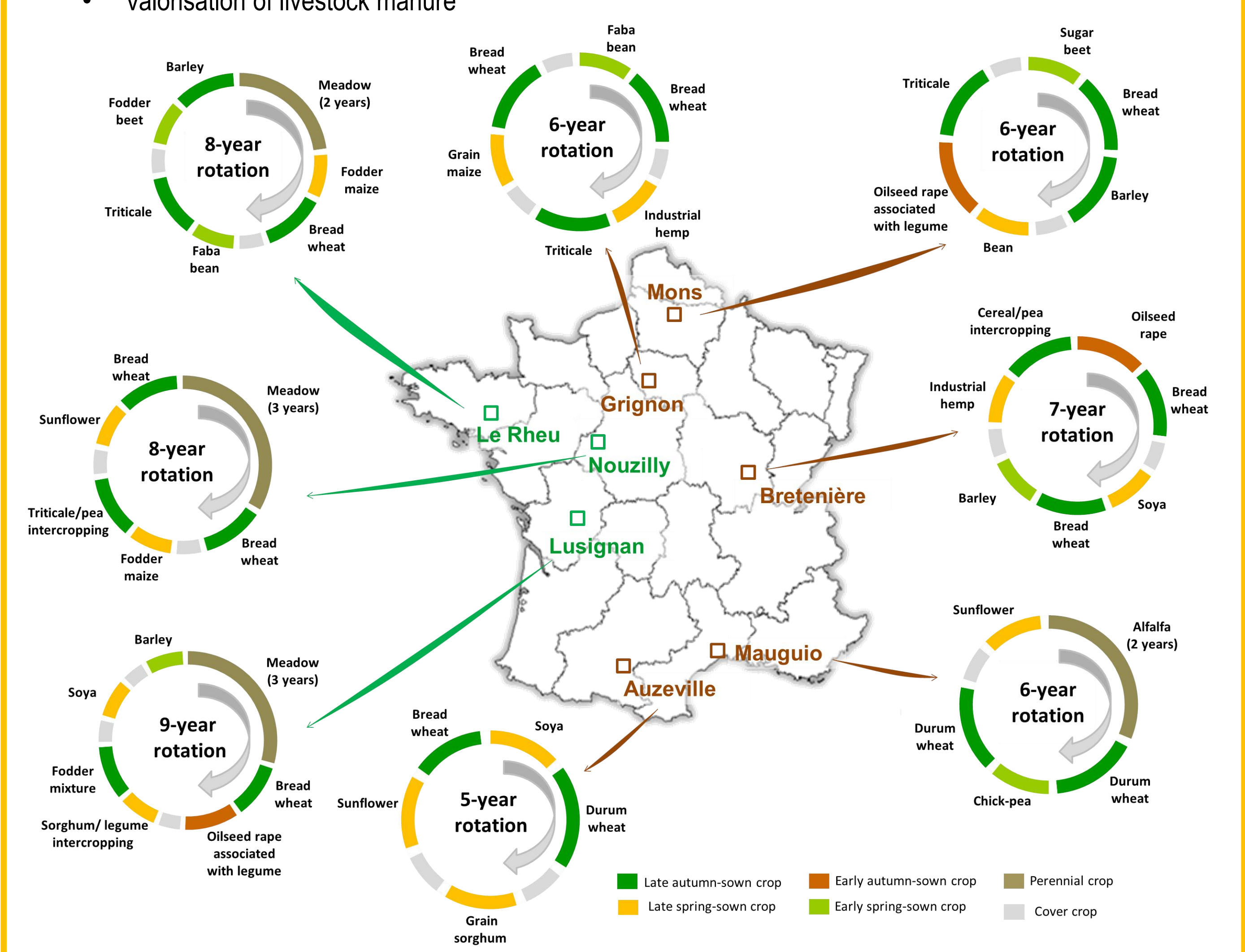
Cropping systems adapted to their regional production situation

Mixed systems

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

Arable crop systems

- Only cash crops



Crop sequence of pesticide free cropping systems tested on Res0Pest sites. Sites related to mixed systems are in green; sites related to arable crop systems are in brown.

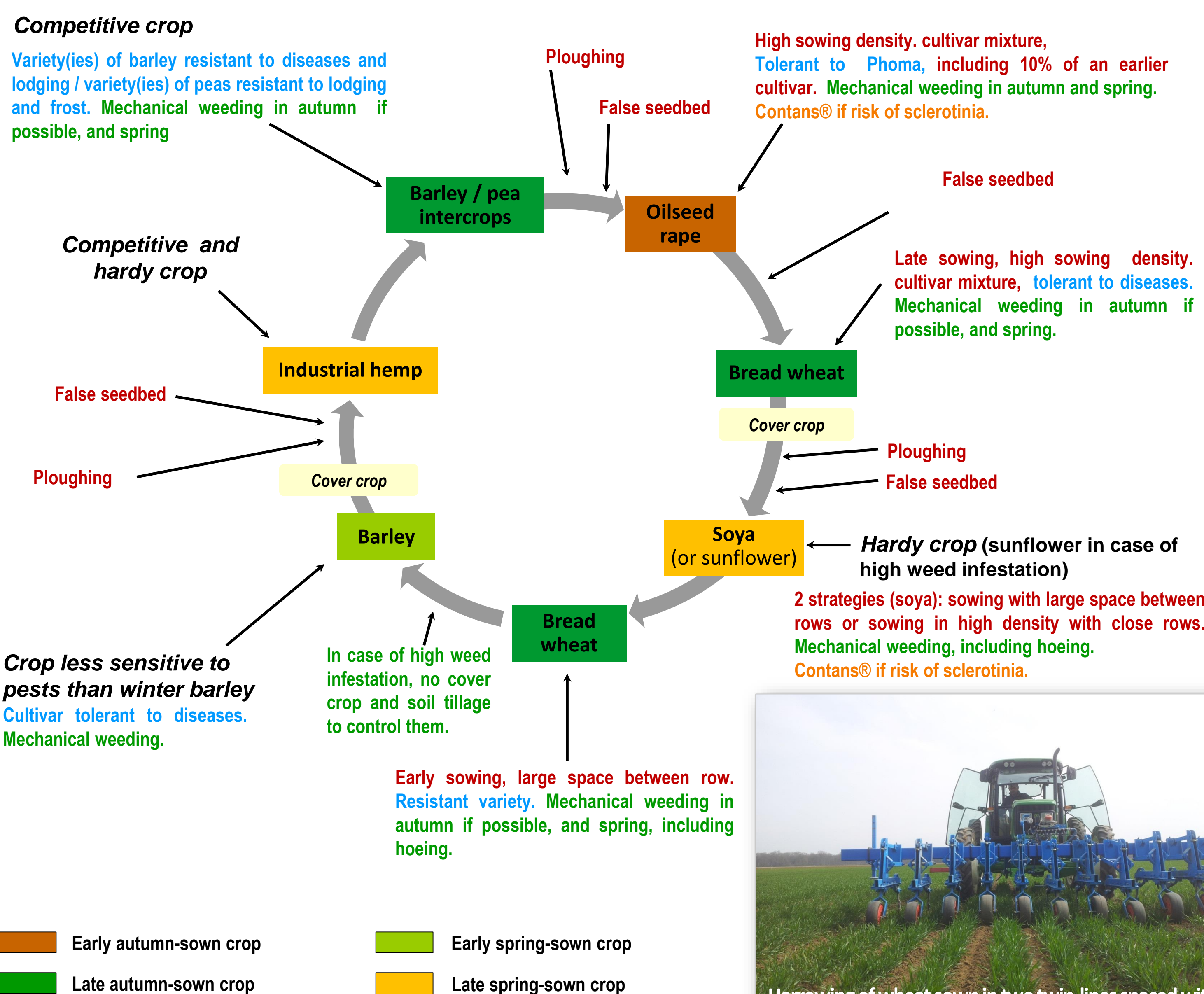
Combining different techniques to limit damages caused by pests

- 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, in interaction with agricultural development and agricultural education

A unique experimental tool to support innovative programmes in Agroecology

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

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

- 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.

