

How do participatory and systemic approaches complete, to design more sustainable orchards ?

Penvern S., Weibel F., Warlop F., Dufils A., Cardona A.

Bellon S., Fauriel J., Alaphilippe A., Corroyer N., Dapena E, Fillatre J.-Y., Guibert Y., Hemptinne J.-L., Jamar L., Laizeau R., Lateur M., Lauri P.-E., Leterme E., Libourel G., Liehn B., Petit J.-L., Ramonguilhem M., Simon S.

CONTEXT

Orchards systems face specific constraints for adaptation: culture pérenne, production de fruits frais 'zéro défaut'

Orchards systems have poor self-regulation: current systems target productivity and require frequent plant protection and fertilization measures and rather suppress than foster the self-regulation of the system to control pests and diseases

The context is changing encouraging producers to reconsider their orchard's design and management:

- Low profit margins in the conventional food-chain

- Environmental and health awareness among consumers, producers and regulators, e.g. EU reduction of chemical active compounds

- Successful new practices and marketing organizations demonstrate potential alternatives

OBJECTIVES OF THE GROUP « VERGERS + DURABLES »



**Re-
conception**

- Tree architecture
- Orchards multi-strata structure
- Temporal & spatial stability



Complex design opportunities to foster ecosystem processes



**Eco-
conception**

- Integrative approach to address interdependent, multi-level and multi-actors issues



**Co-
conception**

But :

- Scarce references on the combined use of alternative methods and their **integration** within the agroecosystem
- Technical and **scientific paradigm shift** : approach, properties and methods



- (i) Redefine properties of sustainable orchards and evaluation criteria
- (ii) Explore new techniques and promising orchards

A group of experts:

24 permanent French-speaking participants :

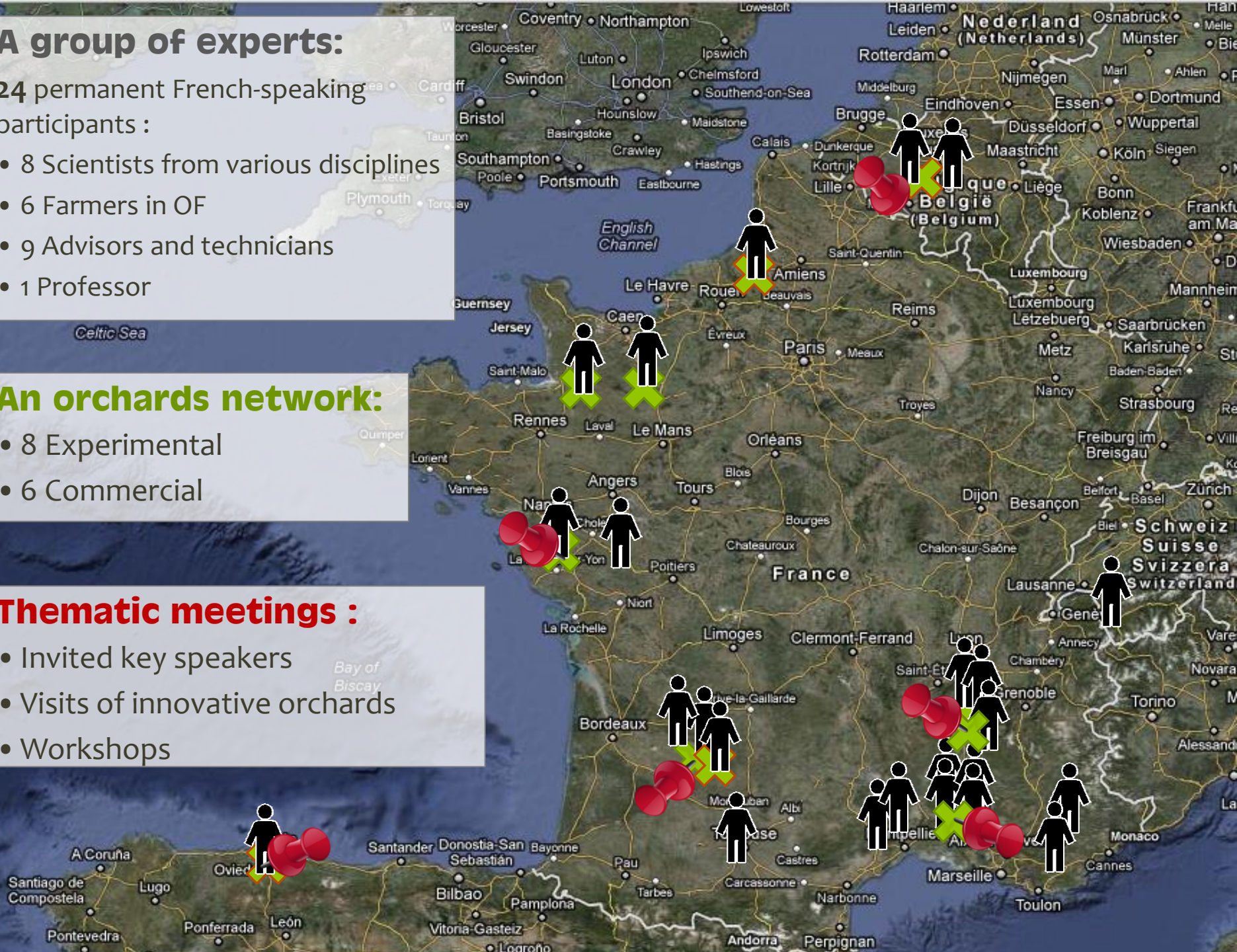
- 8 Scientists from various disciplines
- 6 Farmers in OF
- 9 Advisors and technicians
- 1 Professor

An orchards network:

- 8 Experimental
- 6 Commercial

Thematic meetings :

- Invited key speakers
- Visits of innovative orchards
- Workshops



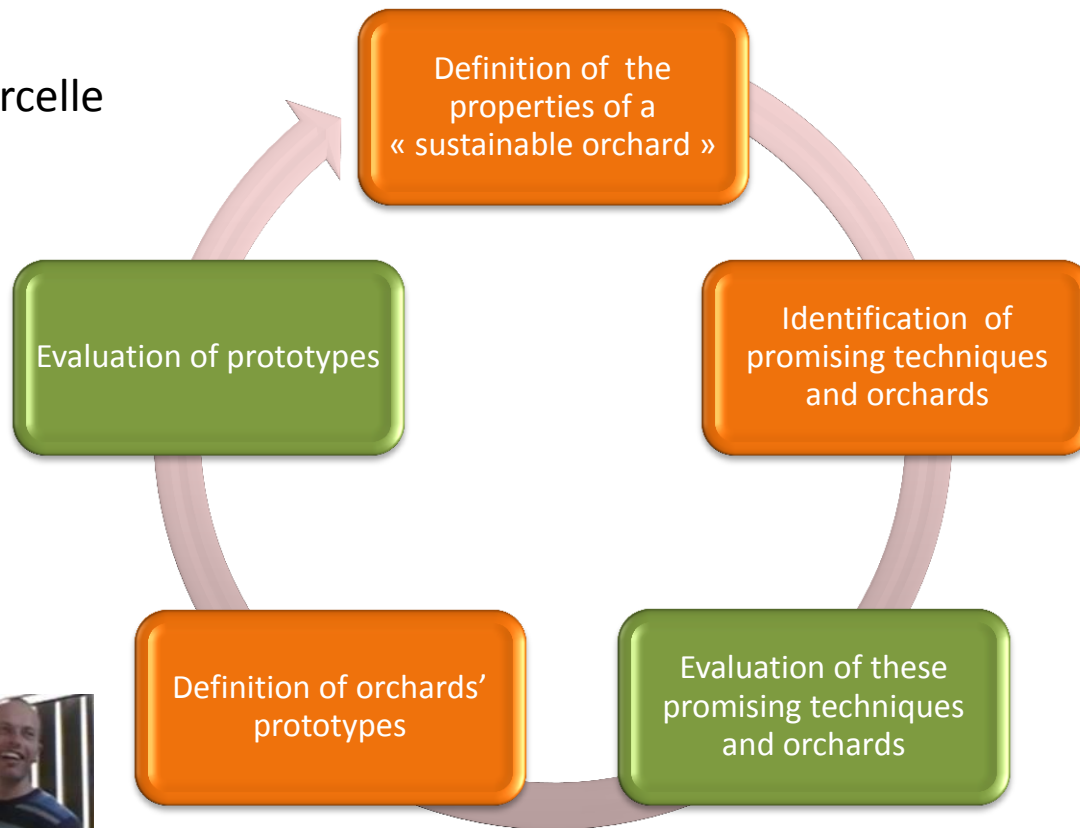
AN ITERATIVE APPROACH



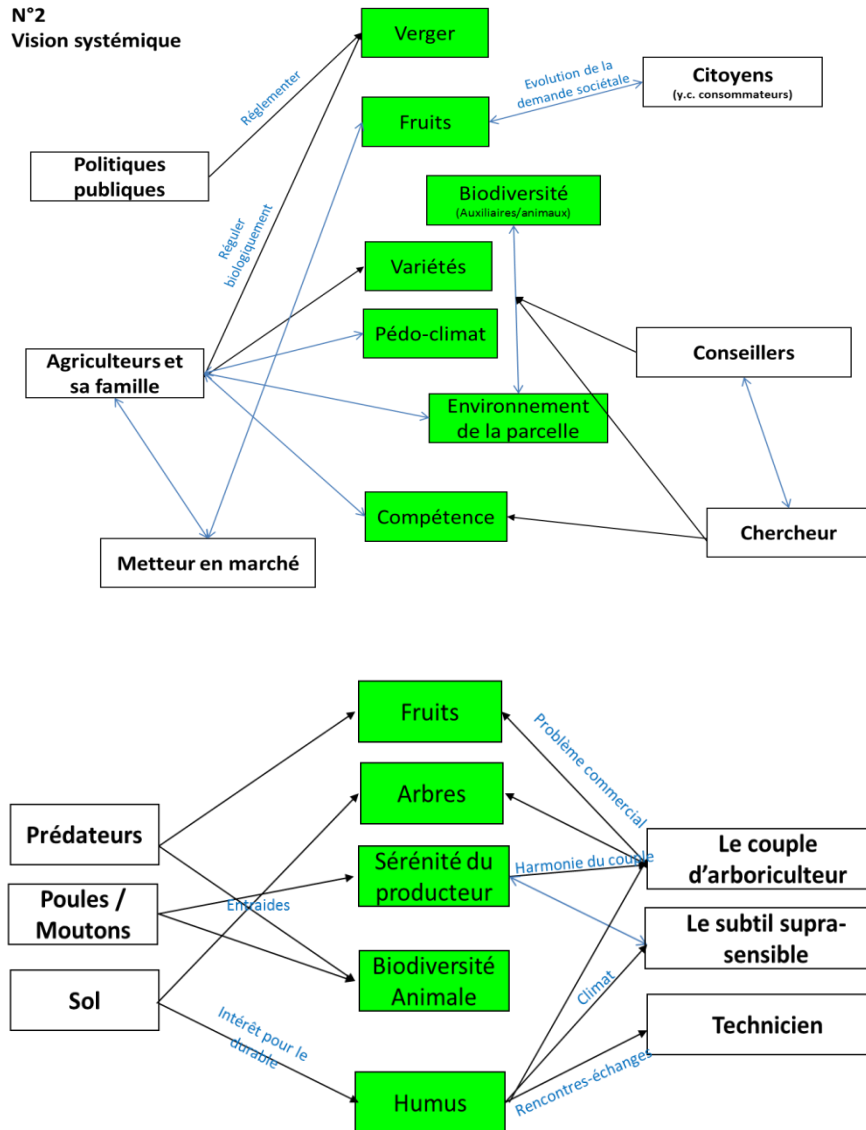
A dire d'experts



En parcelle



COMMON DEFINITION OF THE PROPERTIES OF « SUSTAINABLE ORCHARDS » ?



PARTICIPATIVE SELECTION OF LEVERS AND PROTOTYPES



Technological Orchard

1

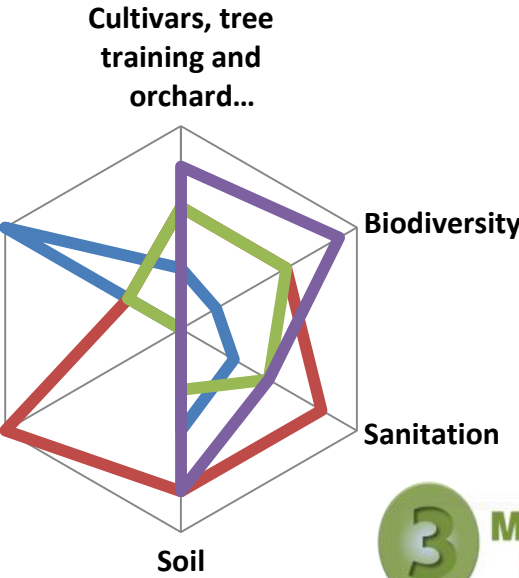
Reproducible & Productive



Ecological Orchard

2

Resilient & Self-functioning



4

Mixed Tree-Animal Orchard

Multi-functional & Self-sufficient

3

Mixed Crop Orchard

Productive & Flexible



EVALUATION OF PROTOTYPES IN EXPERIMENTAL ORCHARDS

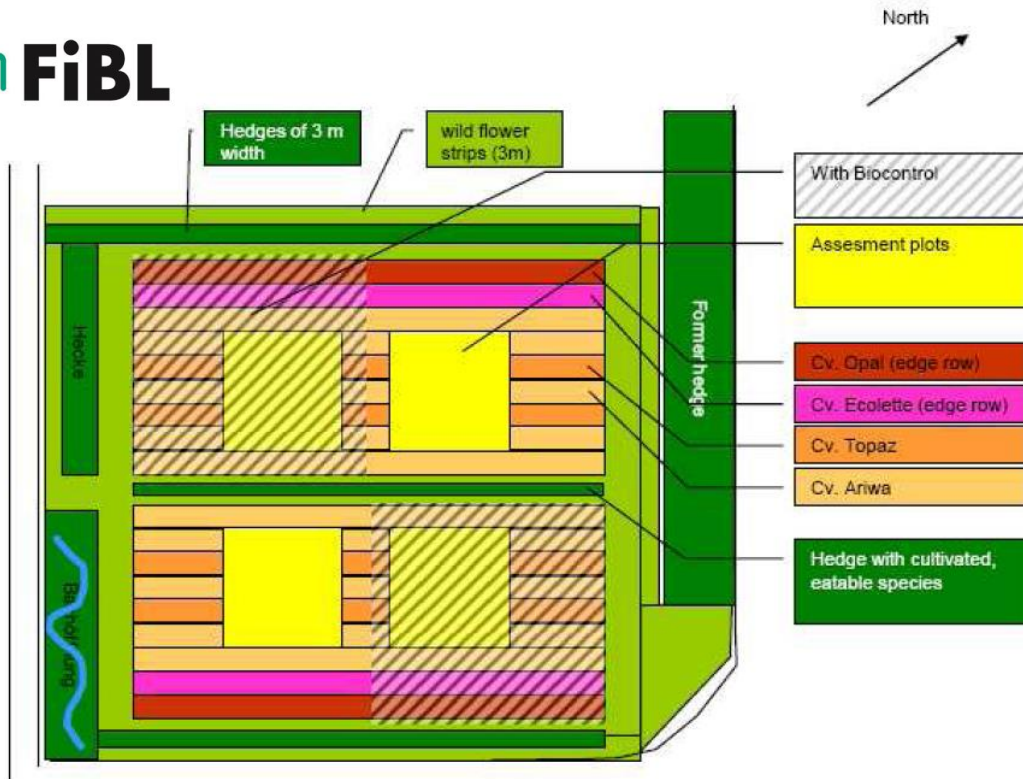


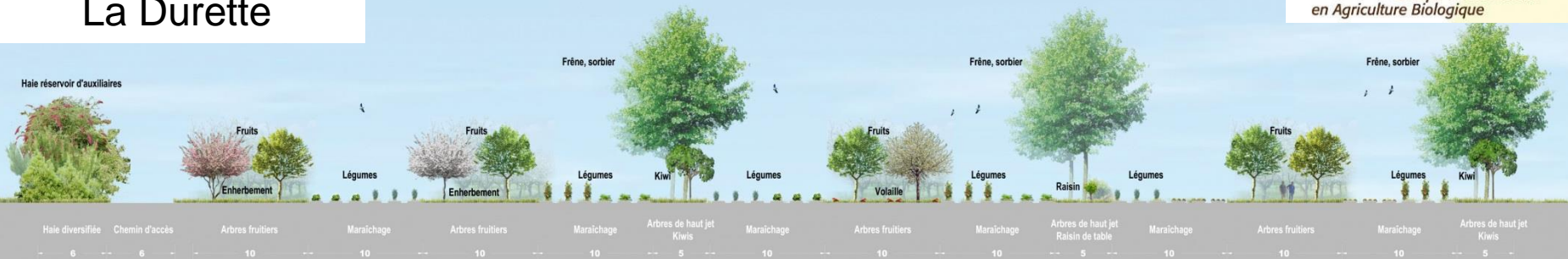
Figure 1: Plan of the self-regulating orchard established at Frick in 2006. Total acreage is 1 ha. Details see text.



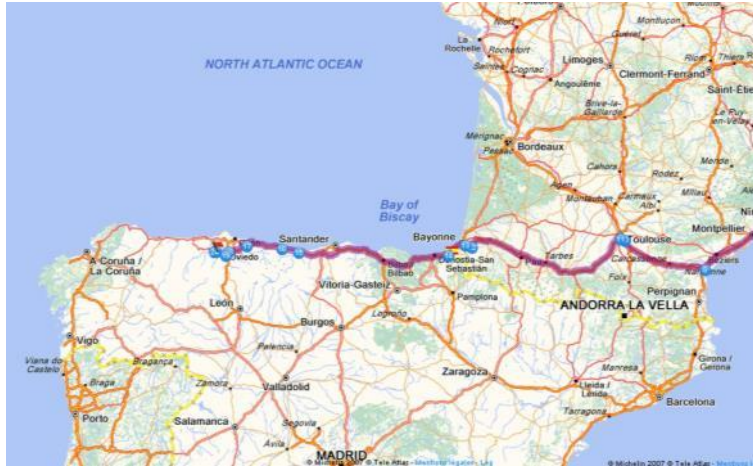
La Castelette

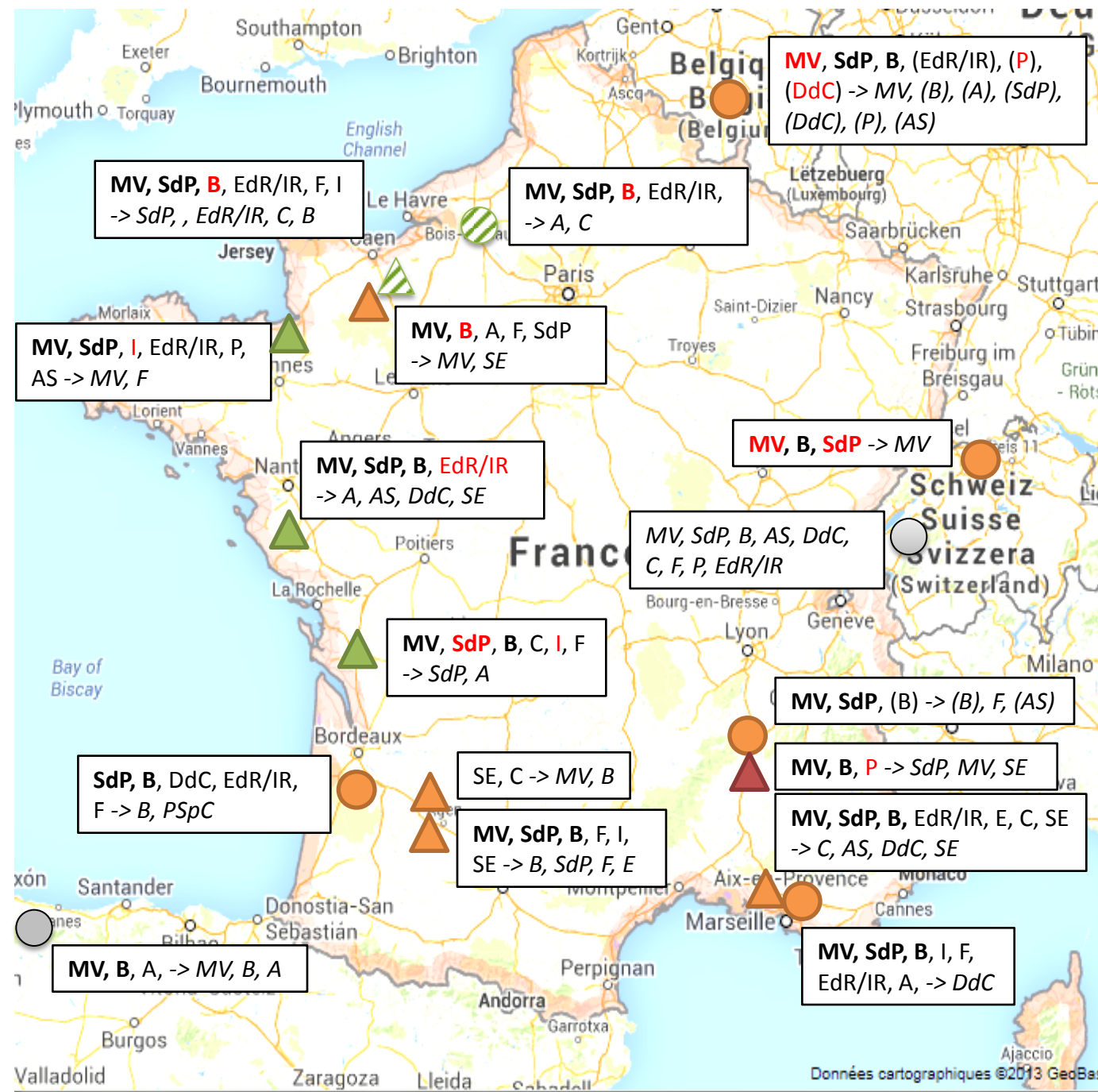


La Durette



AND IN COMMERCIAL ORCHARDS ...





- VD adapté à sa vision
- VD pas mal mais peut mieux faire
- VD éloigné de sa vision
- VD non planté
- parcelle cidricole
- Parcelle expérimentale
- Parcelle producteur

Leviers mobilisés

- MV : matériel végétal
- SdP : stratégie de protection
- B : biodiversité
- EdR/IR : entretien du rang/inter-rang
- F : fertilisation
- C : conduite
- P : palissage
- AS : agencement spatial
- I : irrigation
- DdC : diversification de cultures
- A : introduction animal
- SE : socio-économique
- E : énergie
- PSpC : préparation de sol par culture

En gras : fréquence supérieure

En rouge : effet négatif

En italique : futurs leviers

() : réponse différente selon enquête

MV, SdP, B, (EdR/IR), (P), (DdC) -> MV, (B), (A), (SdP), (DdC), (P), (AS)

MV, SdP, B, EdR/IR, F, I -> SdP, EdR/IR, C, B

MV, SdP, B, EdR/IR, -> A, C

MV, SdP, I, EdR/IR, P, AS -> MV, F

MV, B, A, F, SdP -> MV, SE

MV, SdP, B, EdR/IR -> A, AS, DdC, SE

MV, B, SdP -> MV

MV, SdP, B, AS, DdC, C, F, P, EdR/IR

MV, SdP, B, C, I, F -> SdP, A

MV, SdP, (B) -> (B), F, (AS)

SdP, B, DdC, EdR/IR, F -> B, PSpC

SE, C -> MV, B

MV, B, P -> SdP, MV, SE

MV, SdP, B, F, I, SE -> B, SdP, F, E

MV, SdP, B, EdR/IR, E, C, SE -> C, AS, DdC, SE

MV, B, A, -> MV, B, A

MV, SdP, B, I, F, EdR/IR, A, -> DdC

HOW COMPLEMENTARY ARE SYSTEM APPROACHES ON COMMERCIAL AND EXPERIMENTAL FARMS ?

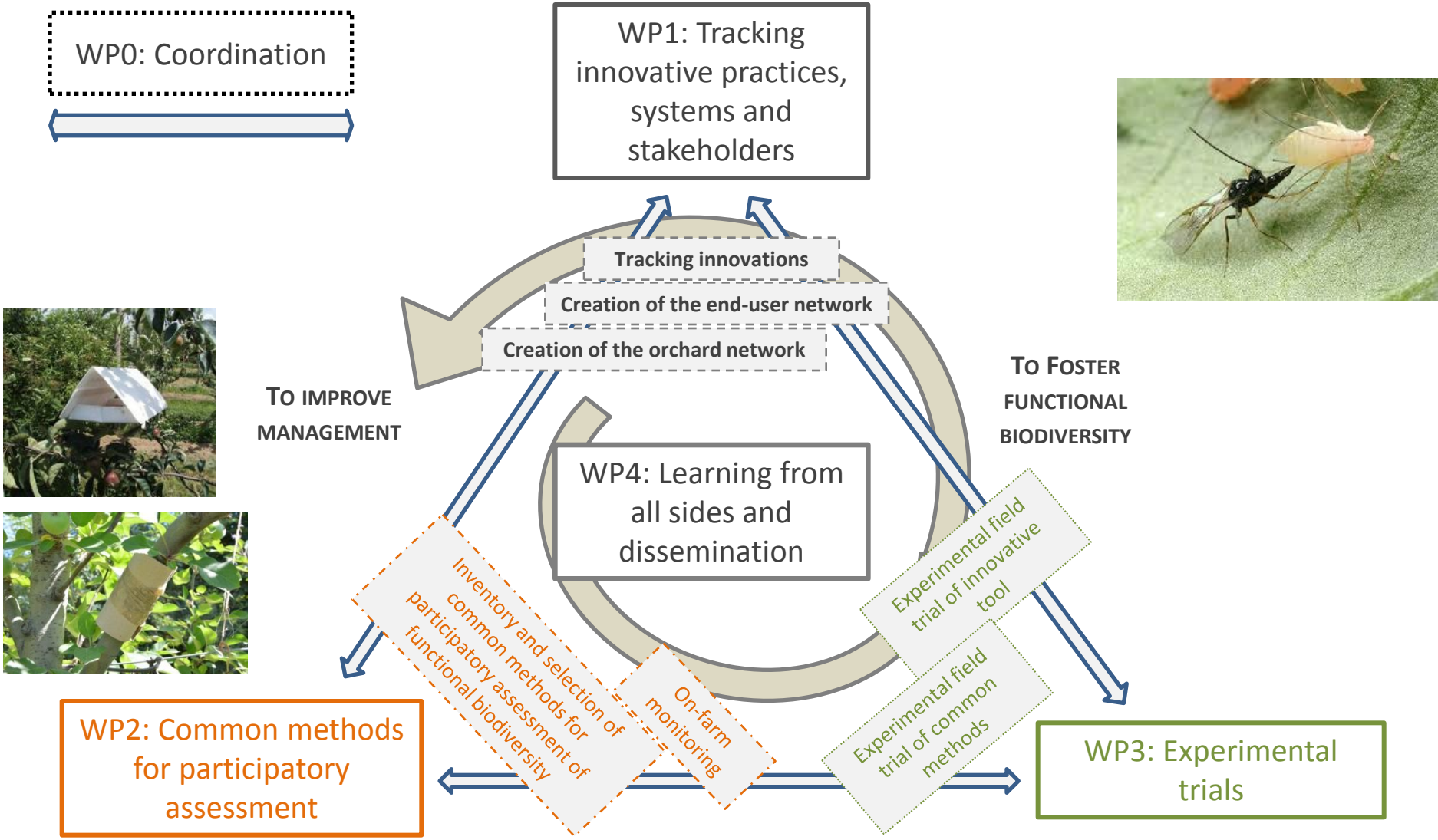
- **Experimental orchards** →
 - More prospective prototypes ?
 - Scientific assessment
- **Commercial orchards** →
 - Increased number of levers implemented
 - Farm scale incl. socio-economical dimensions
 - Field constraints and practitioners assessment



ECO-ORCHARD PROJECT :



TRACKING AND ASSESSING EFFICIENT AND OPERATIONAL TOOLS TO MANAGE AND FOSTER CONSERVATION BIOCONTROL IN ORCHARDS



Thank you !

