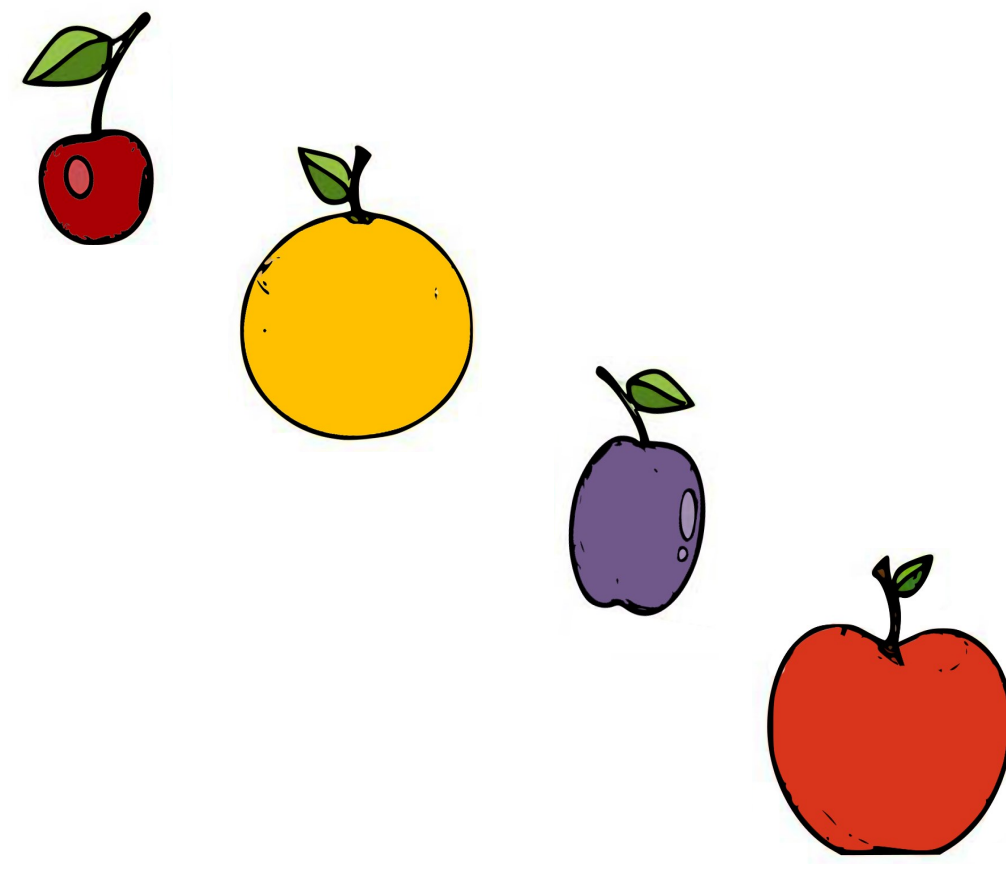


ALTO, towards a pesticide-free agroecological orchard



Context

- **Sustainability** of current orchards is questioned
- Strongly **reducing pesticide use** in current orchards induces **risk of fruit damage** (BioREco¹, EcoPêche² and CAP-ReD³ projects)
- **Is plant diversification a way to reduce pesticide use?**



Aims

- **To rethink the agroecosystem** to produce fruit in very low pesticide or pesticide-free systems & to build **concrete proposals** for tomorrow
- **To evaluate** the effect of plant diversification in the agroecosystem on the orchard sustainability and ecosystem services
- **To share** the approach and knowledge with stakeholders

An agroecological approach

Step by step redesign in a highly diversified environment

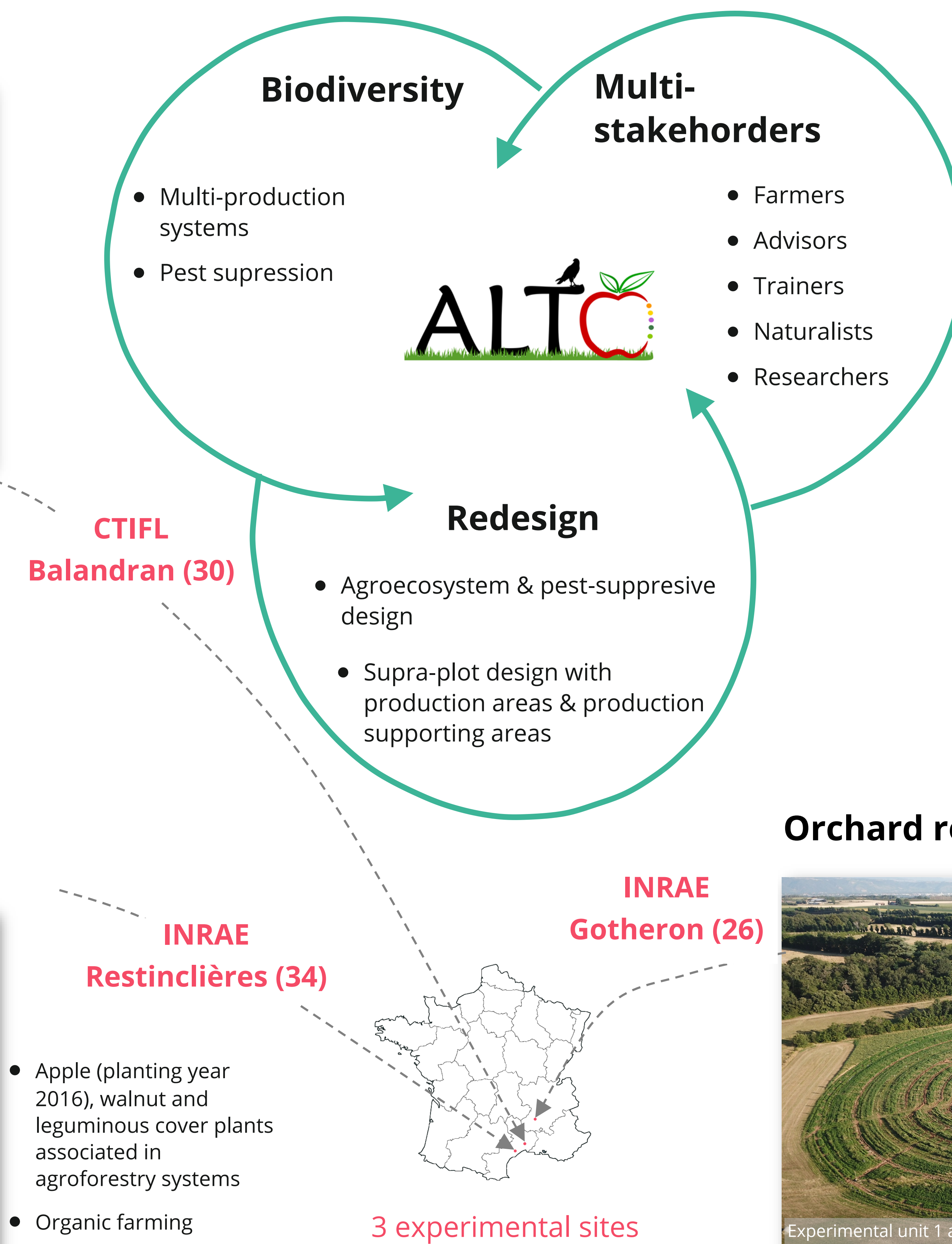


- Alternated fruit tree rows: apple (planting year 2019), olive, apricot, kiwi fruit, persimmon, plum, fig and citruses...
- Habitats and infrastructures to foster biodiversity: hedgerows, ponds, shelters, nest-boxes...
- Organic farming excluding pesticides but biocontrol solutions and low dose copper applications

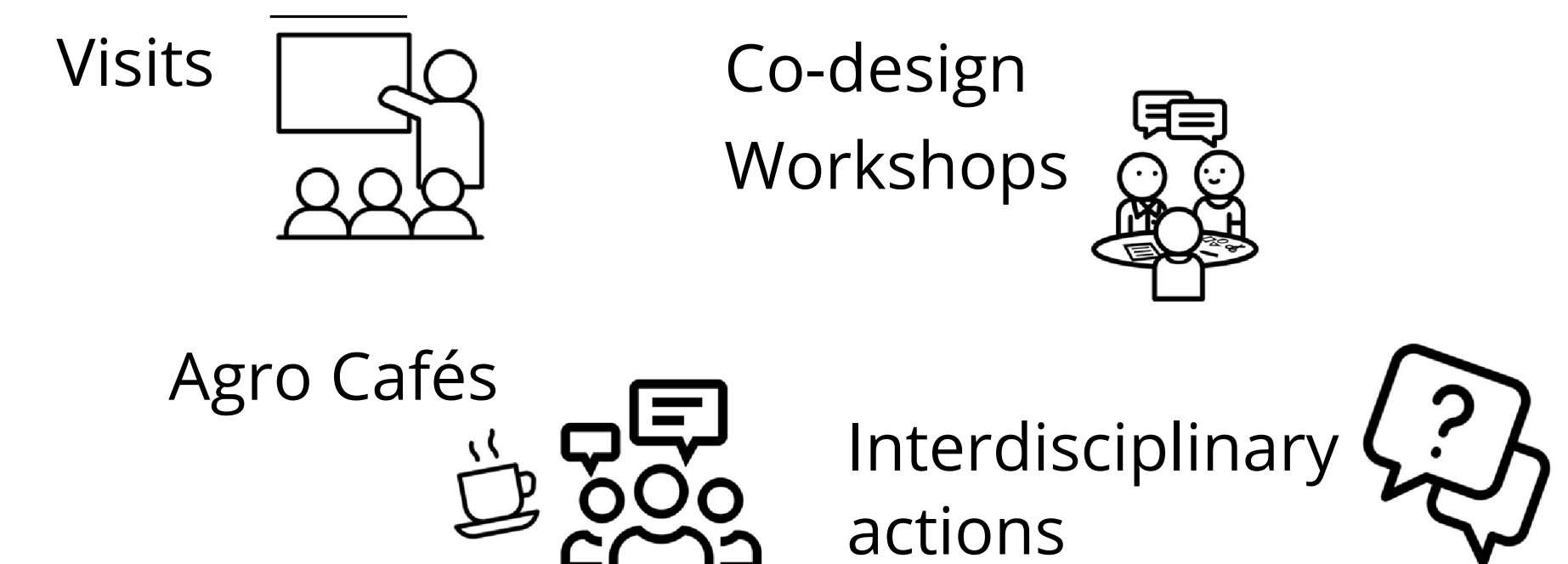
Resource sharing through time and space



Apple tree grown under wood walnut trees at Restinclières (2018)



Participatory approach



Orchard redesign from ground



Experimental unit 1 at Gotheron (2018)

- Fruit species and cultivars alternated within and between 'rows': apple (planting year 2018), plum, peach, apricot, fig, pomegranate, nut fruits, soft fruits...
- Companion plants and habitats to foster biodiversity
- Organic farming excluding all pesticides (even biocontrol)

Expected results

Co-design methodology
to design more or less breaking systems

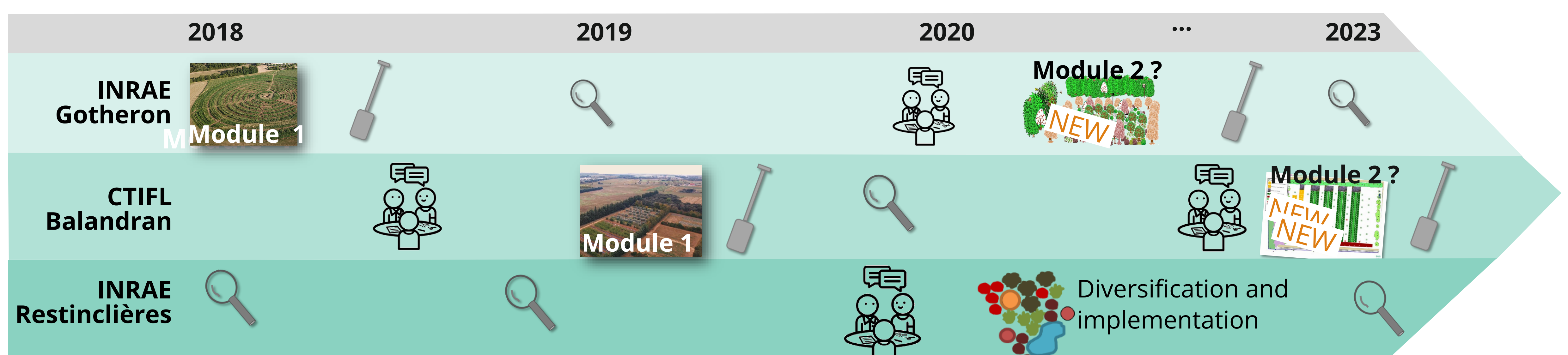
Knowledge about biological processes
Pest suppression, fruit tree behavior in multi-crop systems

Prototypes
of very low-input orchards

Multi-criteria evaluation
of multi-production complex systems

New types of interactions

An ongoing project...



ALTO (Systèmes en Arboriculture et Transition agroÉcologique—Fruit tree production systems and agroecological transition), action financed within the framework of the Ecophyto plan led by the French ministries in charge of agriculture, ecology, health and research, with the technical and financial support of the French Office for Biodiversity.



For further information
¹<https://www6.inrae.fr/experimentations-systeme/Les-experimentations/Arboriculture/BioReco>
²<https://www6.paca.inrae.fr/psh/Contrats-et-Projets/EXPE-DEPHY-Ecophyto-EcoPêche>
³<https://www6.paca.inrae.fr/ueri/Contrats-et-projets/Expe-DEPHY-Ecophyto-CAP-ReD>
<https://www6.paca.inrae.fr/ueri/Contrats-et-projets/Expe-DEPHY-Ecophyto-II-ALTO>
 Contacts:
 INRAE UERI Gotheron
 • Sylvaine SIMON sylvaine.simon@inrae.fr
 • Aude ALAPHILIPPE aude.alaphilippe@inrae.fr
 • Solene BORNE solene.borne@inrae.fr
 CTIFL Balandran
 • Jean-Michel Ricard ricard@ctifl.fr
 INRAE UMR SYSTEM Restinclières
 • Pierre-Eric Lauri pierre-eric.lauri@inrae.fr

March 2020, Realisation : Blandine Rosières INRAE UERI Gotheron