Temperate fruit-based agroforestry systems towards pesticide-free fruit production

Three case studies in Southern France in the framework of the 'ALTO' project

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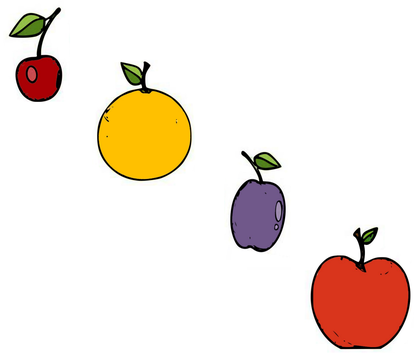
UERI Gotheron
UR PSH
UR Ecodéveloppement
UMR SYSTEM
UR EMMAH Sols

Context

- **Sustainability** of current orchards is questioned
- Strongly **reducing pesticide use** in current orchards induces **risk of fruit damage** (BioREco[1], EcoPêche[2] and CAP-ReD[3] 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

Experimental unit 1 at Balandran (2019)

- 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

CTIFL Balandran

Biodiversity

- Multi-production systems
- Pest supression

Multi-stakeholders approach

- Farmers, Advisors, Trainers, Naturalists, Researchers
- **14 partners**

Redesign

- Agroecosystem & pest suppressive design
  - Supra-plot design with production areas & production supporting areas

Participatory approach

Agro Café « Sheep in orchards», Gotheron 2019

Visits

Co-design Workshops

Agro Cafés

Interdisciplinary actions

Resource sharing through time and space

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

INRA Restinclières

- Apple (planting year 2016), walnut and leguminous cover plants associated in agroforestry systems
- Organic farming

INRA Gotheron

3 experimental sites

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
between stakeholders

For further information

[1]https://www6.inra.fr/experimentations-systeme/Les-experimentations/Arboriculture/BioReco

[2]https://www6.paca.inra.fr/psh/Contrats-et-Projets/EXPE-DEPHY-Ecophyto-EcoPeche

[3]https://www6.paca.inra.fr/ueri/Contrats-et-projets/Expe-DEPHY-Ecophyto-CAP-ReD

https://www6.paca.inra.fr/ueri/Contrats-et-projets/Expe-DEPHY-Ecophyto-II-ALTO

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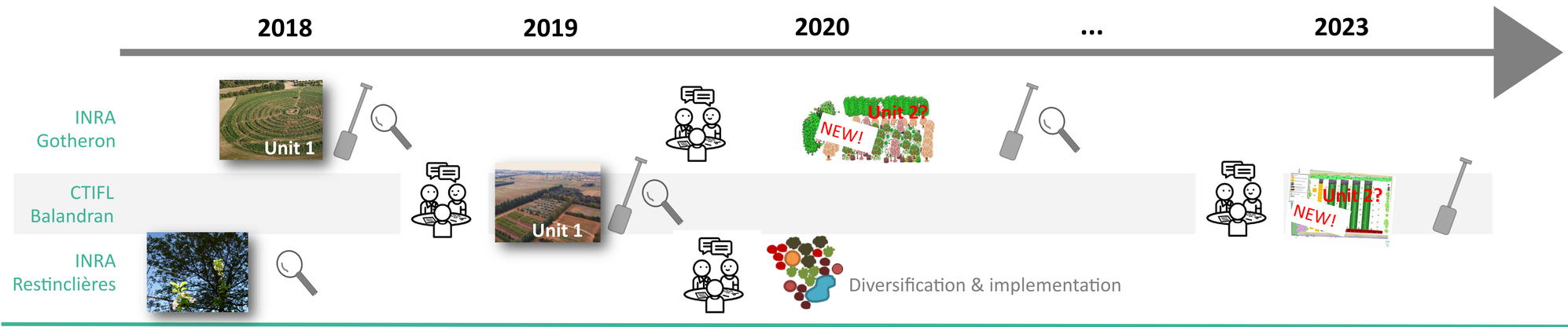
An on-going project...

Planting · Co-design activities · Biodiversity surveys, multi-criteria assessments



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