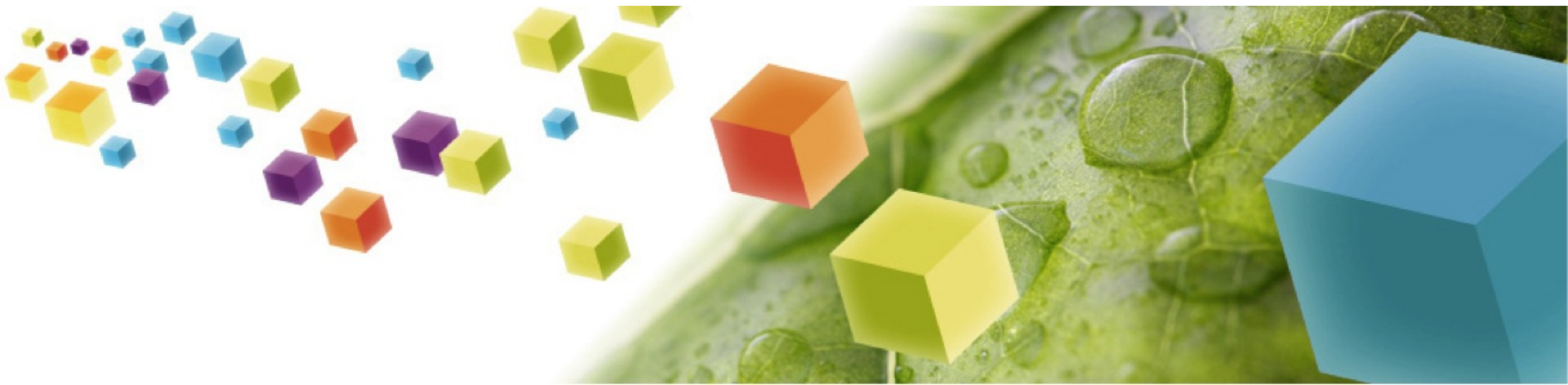


# From Gene To The Bottle

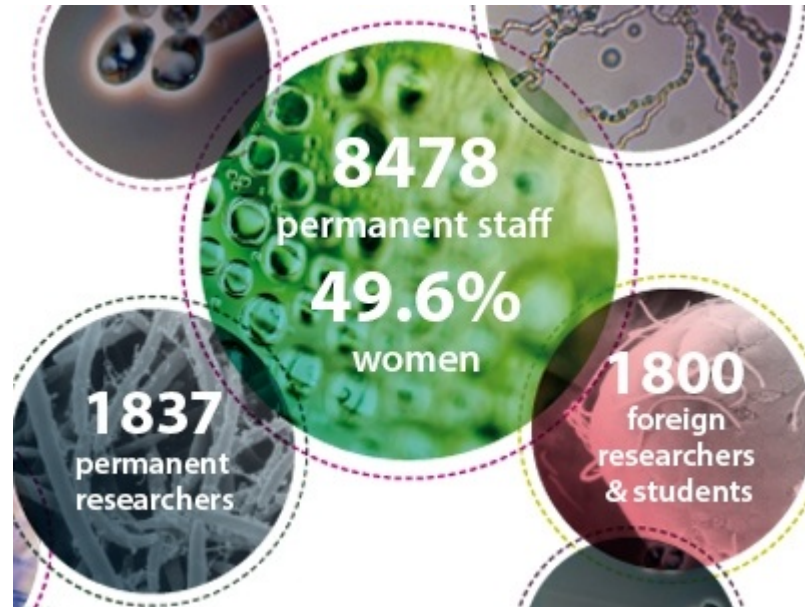
**Credible seminar 2014**

Pascal Neveu  
UMR MISTEA  
INRA



- French Institute for Agricultural Research

- Agriculture
- Environment
- Food



# INRA

## **Agronomy raises integrated scientific issues and challenges:**

- *How to adapt agriculture to climatic change?*
- *How agriculture impacts environment?*
- ...
- *Plant stress and food quality / security*
- *Plant treatment and food safety*

•

# Integrated issues in agronomy

***One category is:***

- ***Agriculture***

***Food processing***



- *Wheat*
- *Olive tree*
- *Coffee tree*
- *Cacao tree*
- *Grape*

...

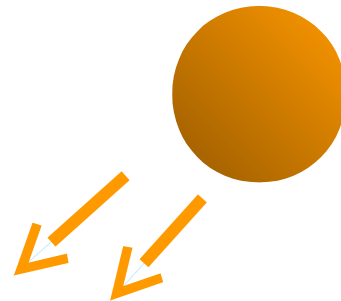
*Bread*  
*Oil*  
*Coffee*  
*Chocolate*  
*Wine*

...

# A representative case

How to adapt wine production process to climatic change?



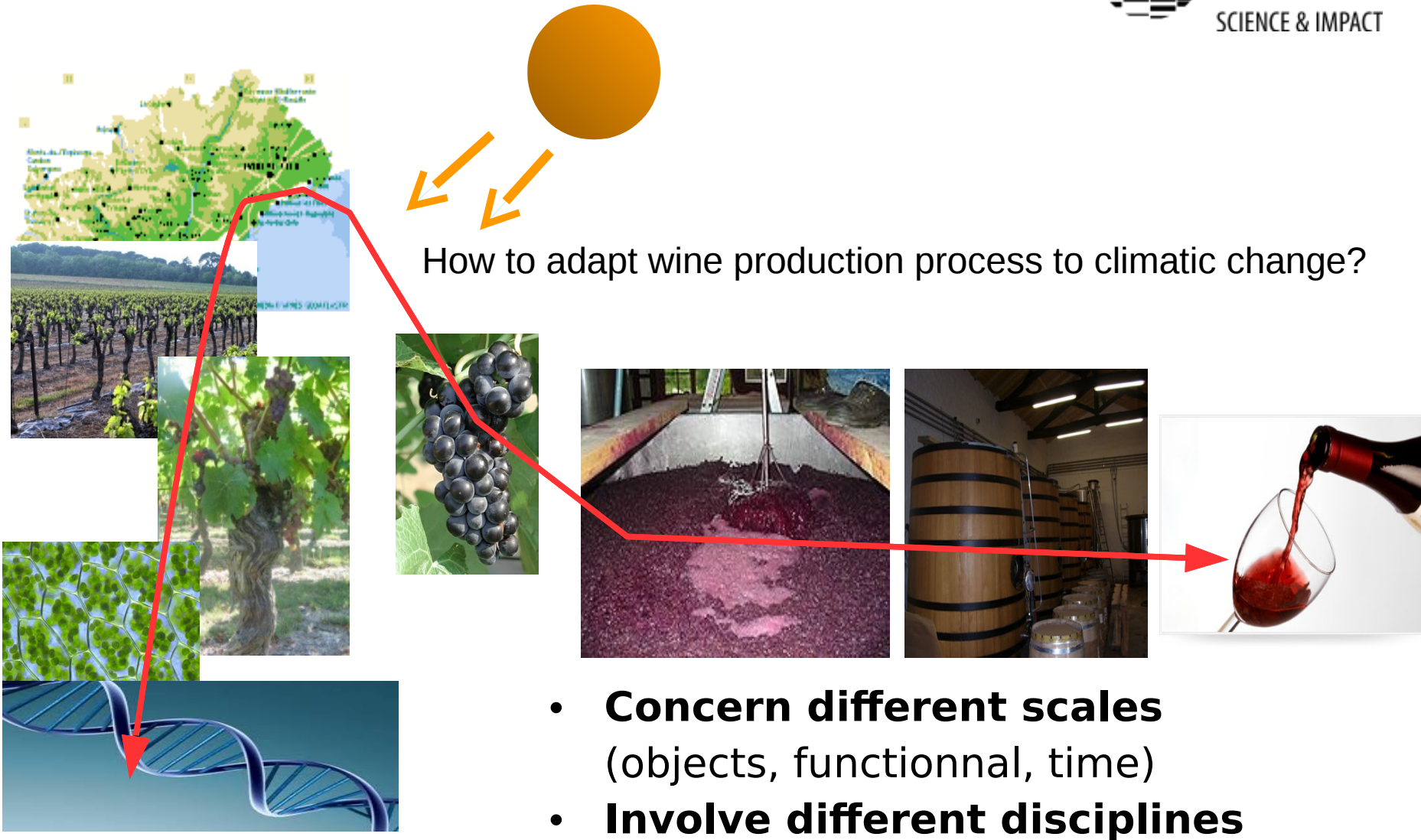


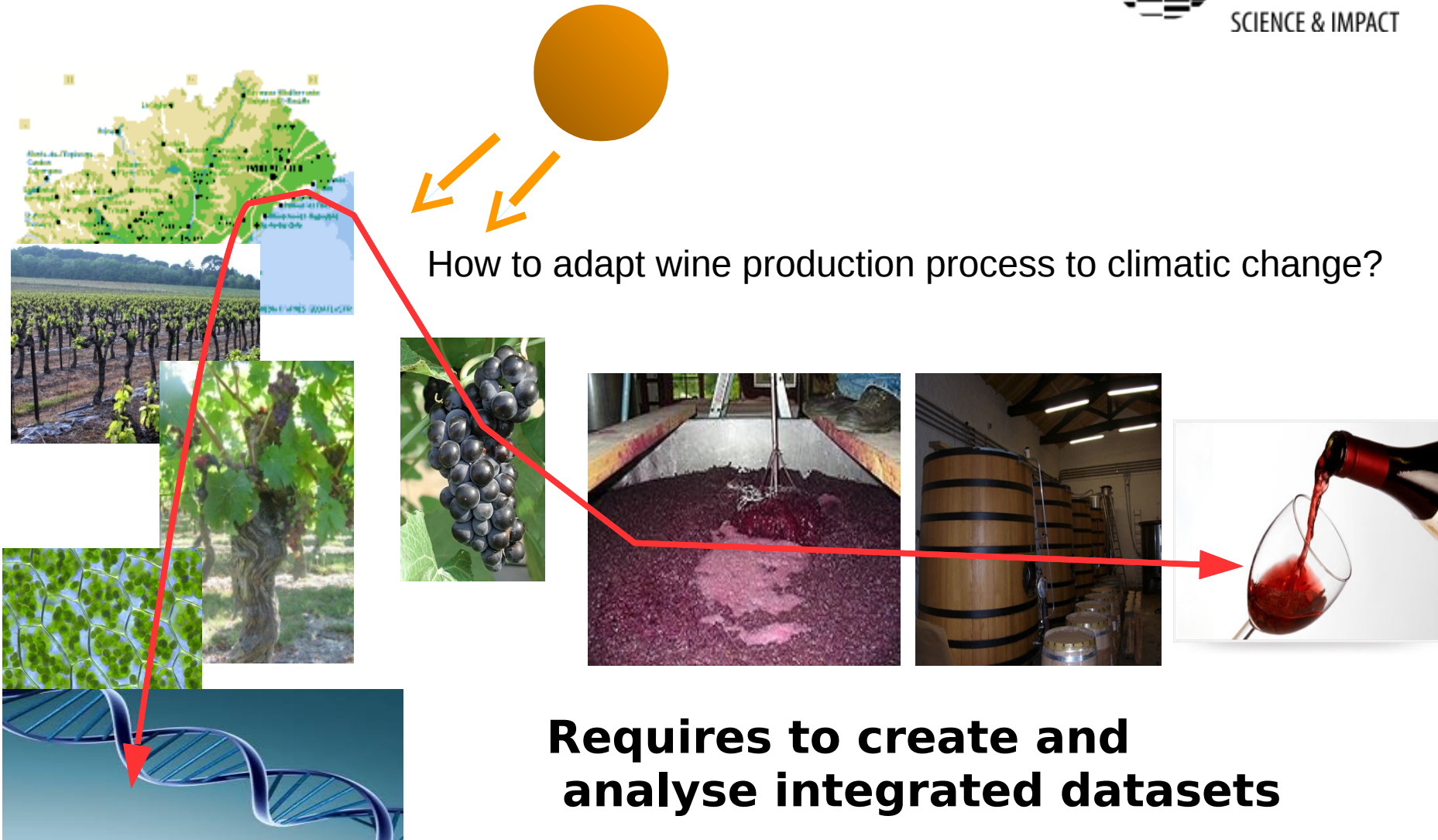
How to adapt wine production process to climatic change?



- **Involve different scales**  
(objects, fonctionnal, time)
- **Concern different disciplines**









# But

## Data and knowledge

- dispersed
- various vocabularies, different semantic
- dynamic and/or fuzzy concepts
- technologie heterogeneity, no standard
- different schema, different organisation,
- ...
- **Not designed for sharing**
- **Strong Disciplinary vision**

## How to

- **Be able to share / make sustainable / make visible?**
- **Ensure continuity between disciplines?**
- **Improve data management practices?**
- **Give a meaning and add value?**
- **...**



# Objectives

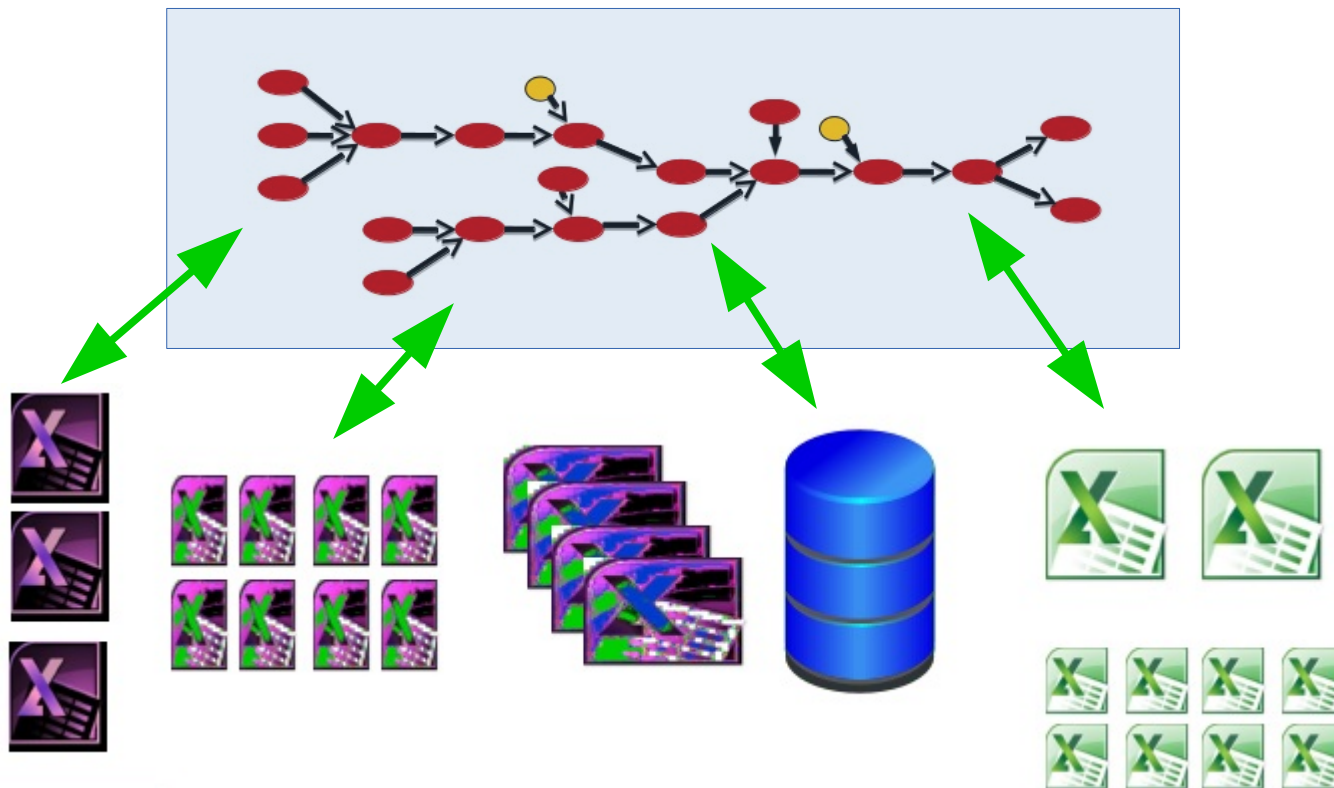
- **Organize thousands of heterogeneous Excel files**
- **Semi/automatically generate integrated datasets**

## **Functionalities:**

- Provide a knowledge layer for the integration of available heterogeneous data sources
- Provide tools for data and knowledge gathering in order to make connections between scale levels and transformation steps
- Provide tools for the organisation of data sources and generation of Integrated datasets

# Knowledge layer

A RDF graph representation of oenological itinerary  
Collaborative RDF graph





# A set of Ontologies

## Developed Ontologies:

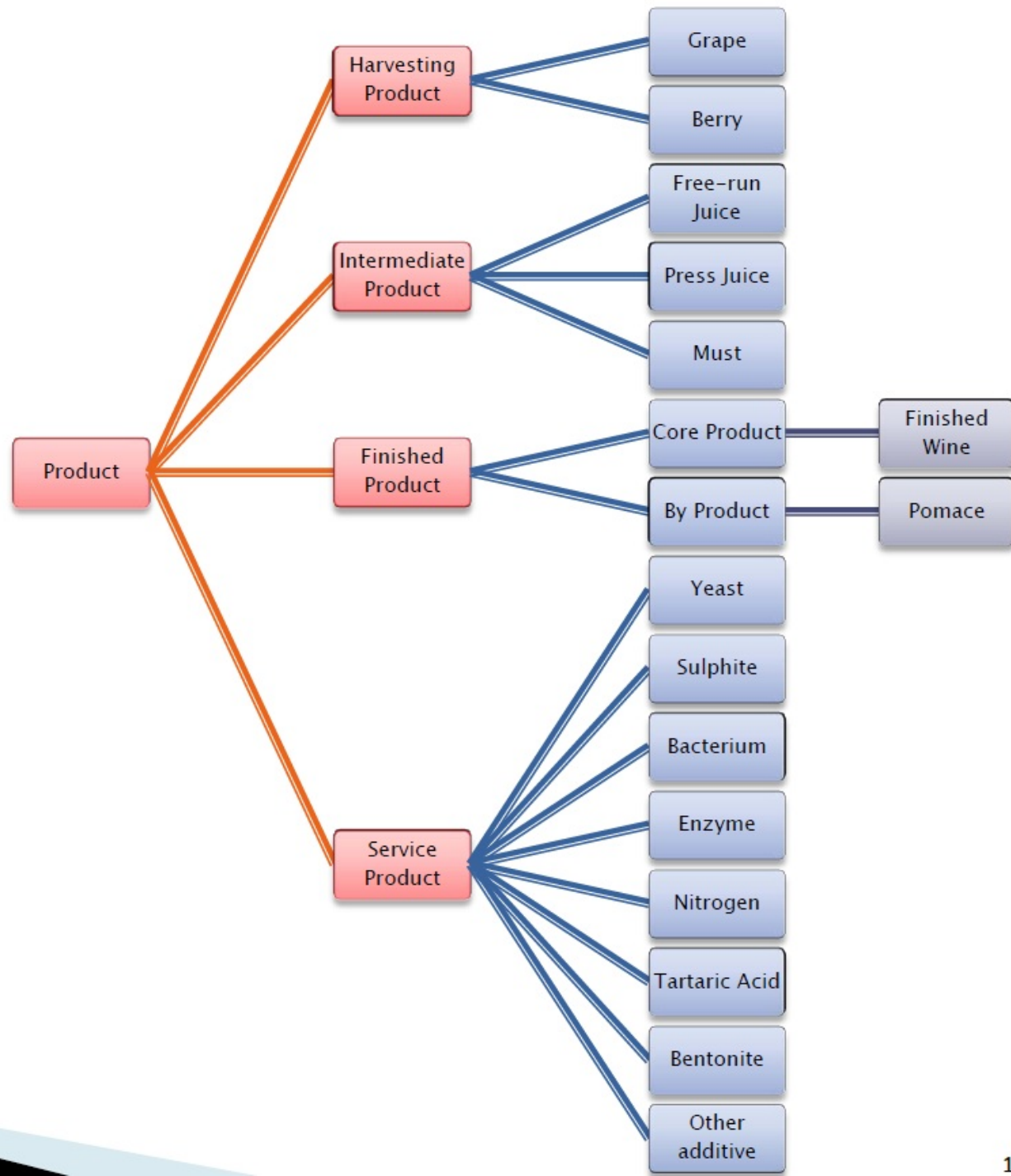
- **Farming / Viticulture**
- **Food transformation / Winemaking  
(use time Ontology)**
- **Specific Excel files (based on simple part-whole ontology)**

## Semantic interoperability

- Upper ontologies (Dolce and SUMO)
- Genomic Grape
- Agrovoc
- Ontocape
- Plant Ontology, Envo, etc

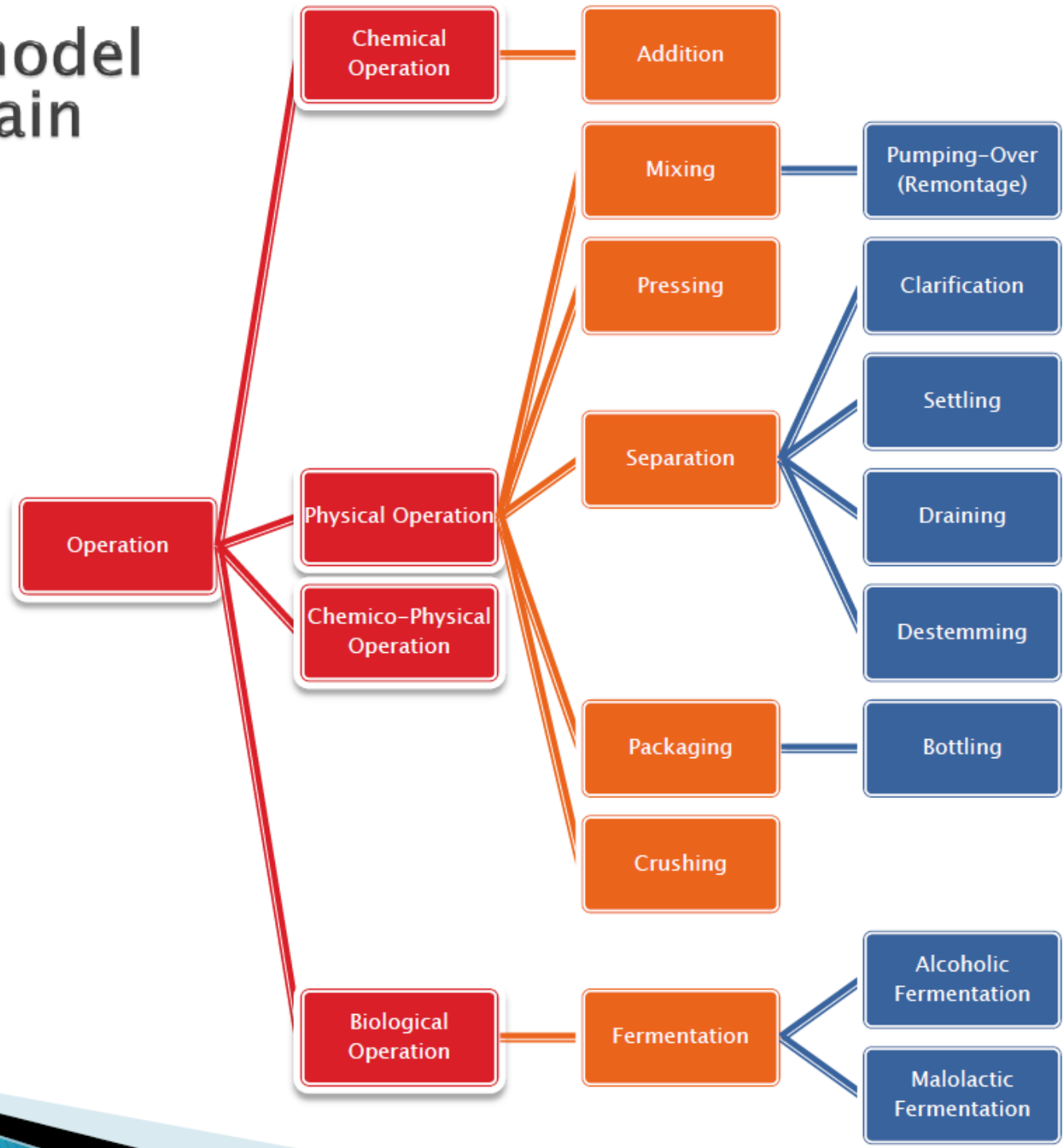
# Ontology model for food chain

## Product Taxonomy

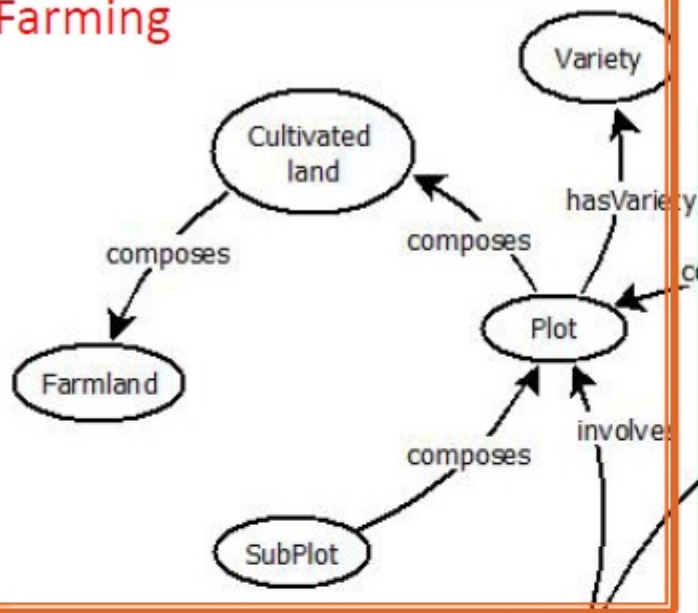


# Ontology model for food chain

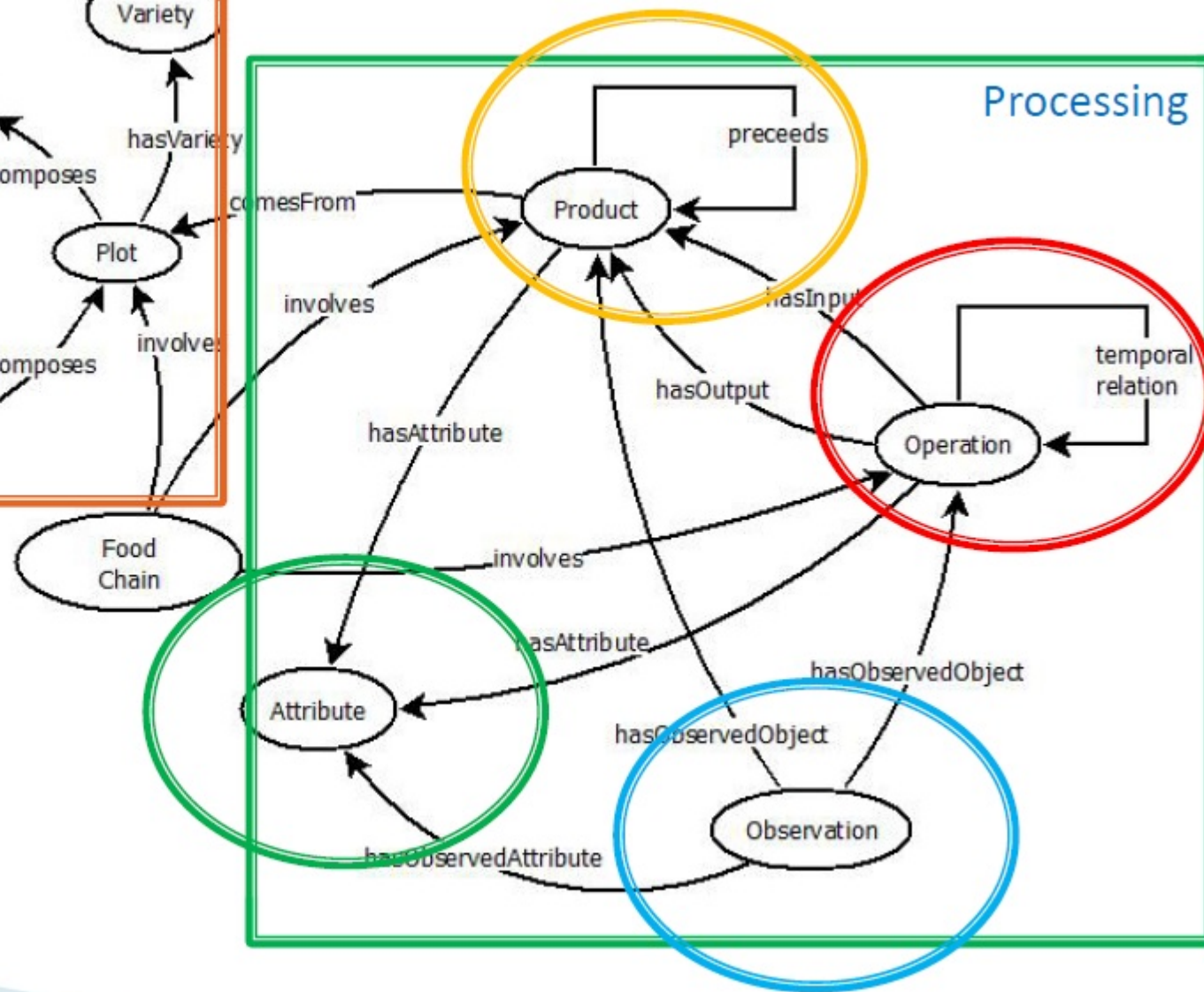
## Operation Taxonomy



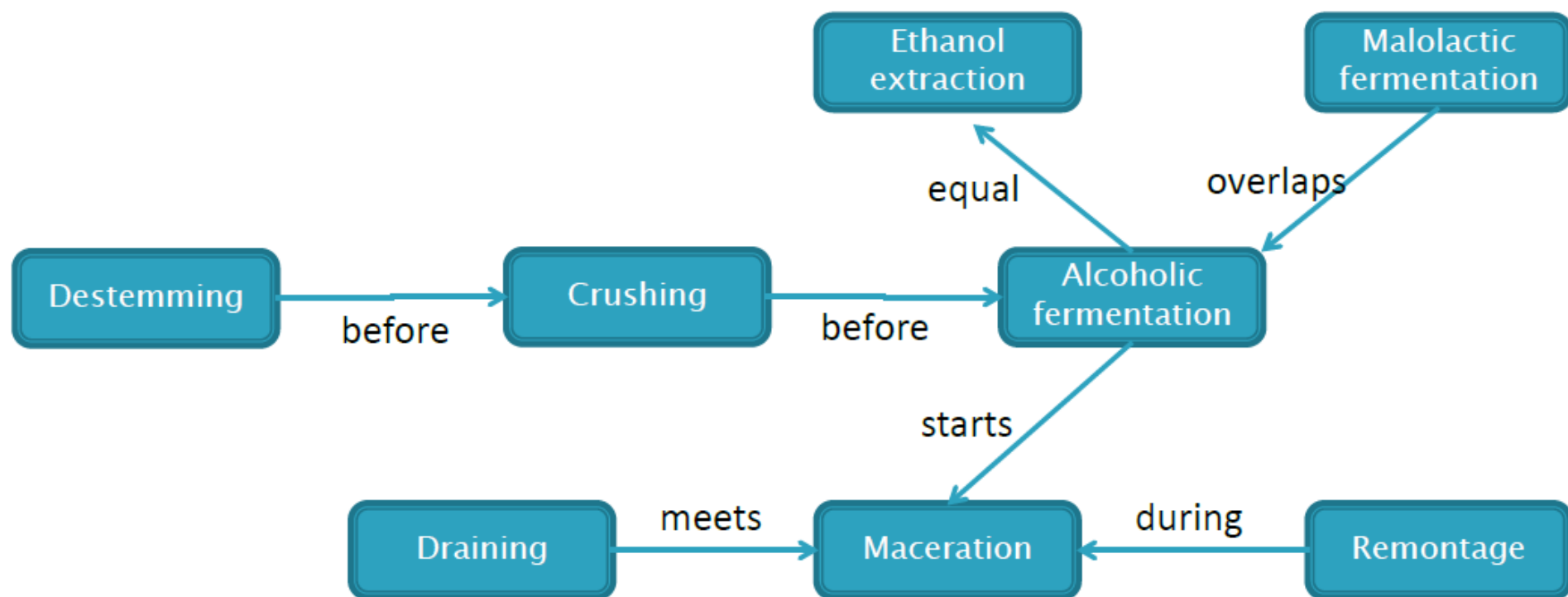
## Farming



## Processing



# Temporal relations between operations (using Ontology of Time provided by W3C)





# Mapping to the DOLCE

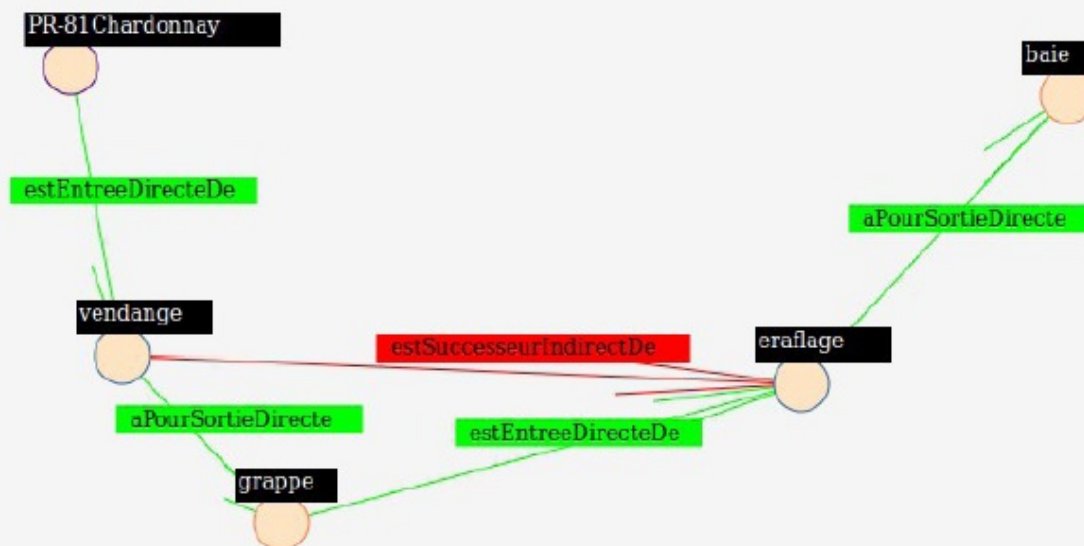


## **Vadrouyes:**

- **RDF instance acquisition via GUI**
- **Knowledge acquisition**
- **RDF graph visualisation**
- **Uncomplete information inclusion**

**Usable from smartphone, pad, laptop**

## Déclaration d'itinéraire | Mode graphique



### Coin infos

Code : baie  
ID complet : Test\_VinifRouge-baie  
Objet : Material

Type : Baie  
DateDebut : 15/08/2013  
DateFin : 17/08/2013  
Equipement :  
LieuStockage :  
Quantite :  
Commentaires :

Liste des relations sortantes

OXeean

OpenRDF Workbench...

localhost:8181/OXeean/itinerary

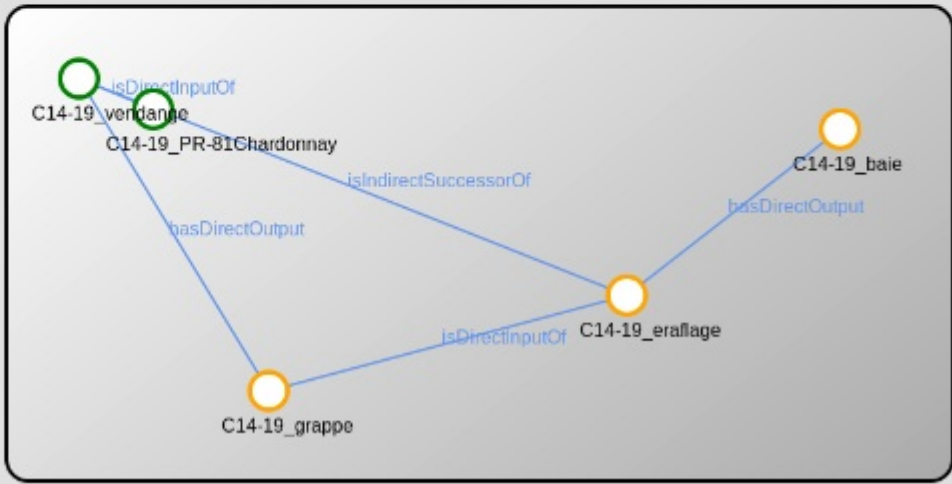
MISTEA Server Messengerie Inra OXeean VITPhe

**OXeean**  
Annotation Environment for EXcel files via Ontologies

**C14-19**

Fichiers associés à C14-19 (2)

Nom de fichier
<a href="#">2013-Domaine-Matu-16Septembre.xls</a>
<a href="#">2013_c14_19.xls</a>



```


graph LR
    V((C14-19_verdange)) -- isDirectInputOf --> P((C14-19_PR-81Chardonnay))
    P -- hasDirectOutput --> G((C14-19_grappe))
    G -- isDirectInputOf --> E((C14-19_eraflage))
    P -. isIndirectSuccessorOf .-> E
    E -- hasDirectOutput --> B((C14-19_baie))
  
```

OXeean

OpenRDF Workbench...

localhost:8181/OXeean/Info

MISTEA Server Messengerie Inra OXeean VITPhe



Annotation Environment for EXcel files via Ontologies

Charger un fichier

Fichier : 2013-Domaine-Matu-16Septembre.xls

Nombre de feuilles : 1

Feuille(s) active(s) : 1

Nom : Maturite

Type : Feuille de produits

Correspondance fichier - itineraire

Feuille	Date	Itineraire	Instance de l'itineraire	Code
Maturite	08/2013	C14-19	C14-19_PR-81Chardonnay	81-CHARDONNAY
Maturite	08/2013	C10-1	C10-1_PR-22Syrah	22-SYRAH



## Results

Ontology implementation incomes

- Collaborative semantic graph → reduce disciplinary gap
- Different communities access larger Excel file sets
- Integrated dataset generation

## Perspectives

- Improve dataset generation
- Make available to more users (20 research units)
- Adapt to a new case (Wheat/pasta?)