

· TEMPO  - **The French national network of phenology observatories**

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TEMPO members





TEMPO network was created in **2017**...

... from the **association of existing** French research **networks** (GDR, PERPHECLIM,...), **citizen sciences programs** (Observatoire des Saisons and Phenoclim CREA) ...

and new scientist and partners working on phenology

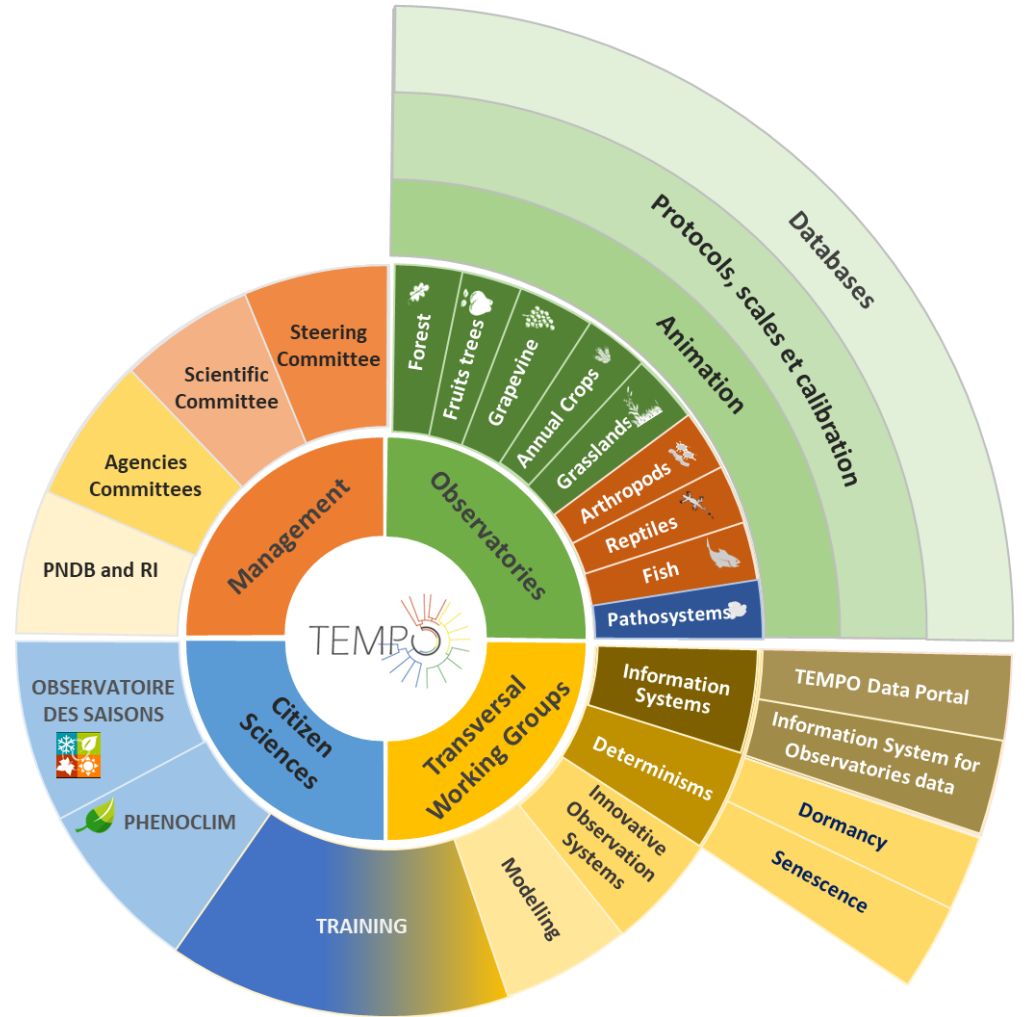
TEMPO mission

Create a research infrastructure and community for documenting, understanding and predicting climate change impact on living organisms phenology and the consequences on systems productivity and populations survival and distribution





Organization

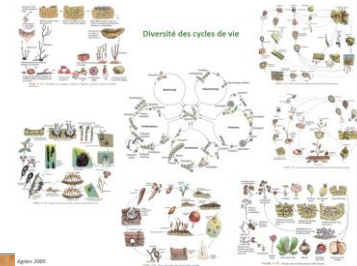


Main activities



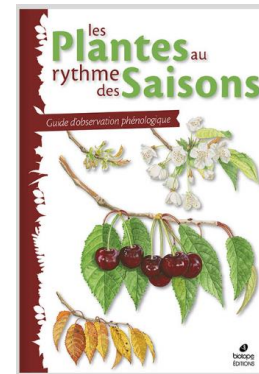
Data management and dissemination

Portal, datahub, Dataverse, DMP, National and International



Animation, training and research

Multi-disciplinary, trans-observatory and citizen



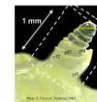
Modeling and Pheno-climatic services

Development and use of models (developed from acquired data and knowledge)



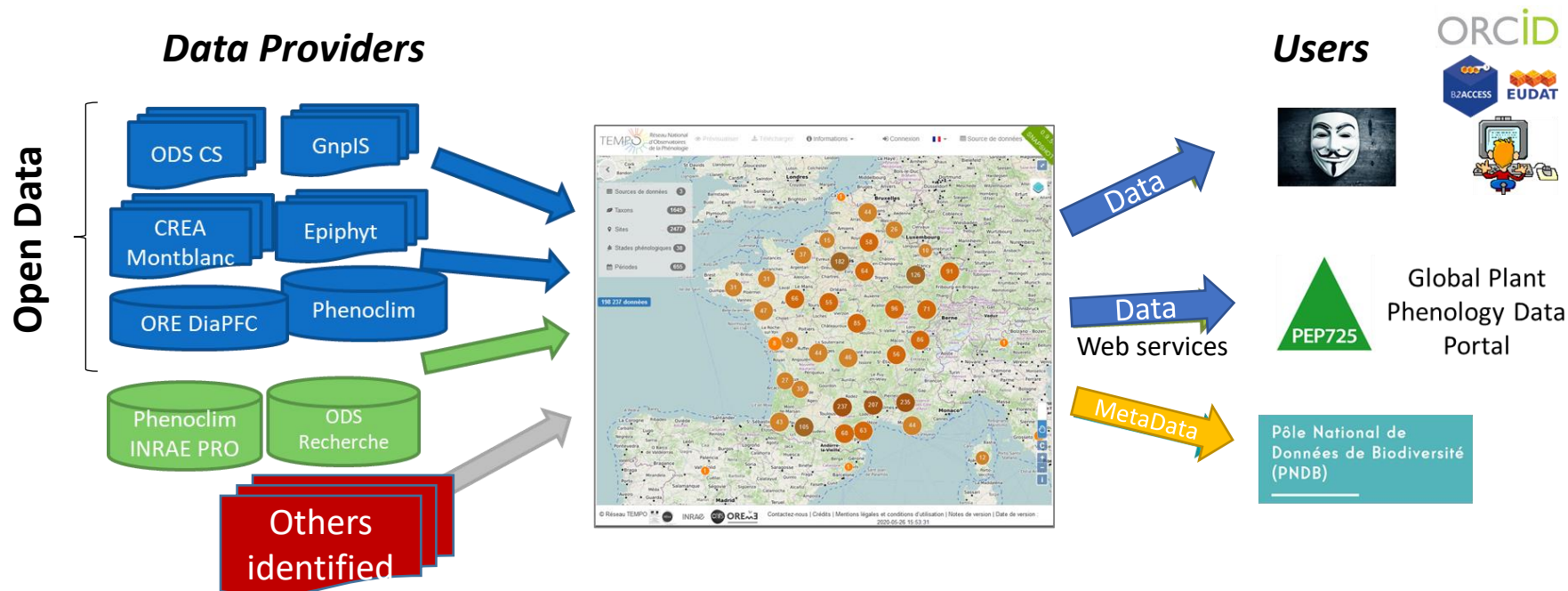
Development of new observation methods

Scales, protocols, inter-calibration, innovative tools





TEMPO Data Portal <https://data.pheno.fr>



Research data + Citizen Science Data + Professional Data

- > 2.48 M of data (+0.28 M)
- 2660 taxa (+600 taxa)
- 11775 sites (+800 sites)
- 660 years (1349-2022)



Data management and dissemination



Data Hub and Dataverse

TEMPO Dataverse

INRAE Data | Recherche | À propos | Guide d'utilisation | Support | Français | S'inscrire | Se connecter

TEMPO (www.inrae.fr) | Dépot de données de TEMPO - Réseau National d'Observatoires de la Phénologie

Portail Data INRAE > Experimental - Observation - Simulation Dataverse >

Contact | Partager

TEMPO - Réseau National d'Observatoires de la phénologie

Chercher dans ce dataverse... | Chercher | Recherche avancée

Dataverses (0)

Datasets (7)

Fichiers (35)

Année de publication
2020 (5)
2019 (2)

Data Origin
observational data (6)
experimental data (5)

Kind of Data
Dataset (7)
Collection (3)
Event (3)
Image (1)
Other (1)

Plus...

Author Name
Delépine, Anthony (2)
Didelot, Frédérique (2)
Lanoue, David (2)
Lemarquand, Arnaud (2)
Orain, Gilles (2)

1 à 7 de 7 résultats

Phenological data of 26 varieties of apple, apricot, cherry trees and peach trees in a French orchard of Loire Valley since 2016
15 janv. 2021 - Fruit tree phenology
Lanoue, David; Delépine, Anthony; Orain, Gilles; Lemarquand, Arnaud; Didelot, Frédérique, 2020, "Phenological data of 26 varieties of apple, apricot, cherry trees and peach trees in a French orchard of Loire Valley since 2016", <https://doi.org/10.15454/SCTMIU>, Portail Data INRAE, V3, UNF:6.4T2gNqOfSaadZozPP5yWQ== [fileUNF]
These datasets contain phenological observations on 7 apple, apricot, cherry varieties or mutants and 5 peach varieties evaluated since 2016. These data come from observations carried out since 2016 on the "La Rétuzière" estate belonging to the Horticulture Experimental Facility...

Phenological data of 28 apple tree varieties and 4 pear tree varieties in a French orchard of Loire Valley since 2004
14 janv. 2021 - Fruit tree phenology
Lanoue, David; Delépine, Anthony; Orain, Gilles; Lemarquand, Arnaud; Didelot, Frédérique; Maquaire, Jocelyn; Hameline, Sylviane, 2020, "Phenological data of 28 apple tree varieties and 4 pear tree varieties in a French orchard of Loire Valley since 2004", <https://doi.org/10.15454/D4MJKL>, Portail Data INRAE, V2, UNF:6.QaG+2dDPTCDX1CR8yQSKQw== [fileUNF]
These datasets contain phenological observations on 28 apple varieties or mutants and 4 pear varieties evaluated since 2004. These data come from observations carried out since 2004 on the two sites of the Horticulture Experimental Facility based in the Loire Valley in France. Th...

Phenological data of 26 varieties of cherry, apricot, peach and apple trees since 2016 in a French orchard of Touloune, Gironde, France
4 sept. 2020 - Fruit tree phenology
Alletru, David; Gazel, François; Corradi, Michel; Greil, Marie-Laure; Delmas, Marine, 2020, "Phenological data of 26 varieties of cherry, apricot, peach and apple trees since 2016 in a French orchard of Touloune, Gironde, France", <https://doi.org/10.15454/TJTV6N>, Portail Data INRAE, V1, UNF:6.yOKVPSlymmP7Vhz1SYVA== [fileUNF]
This dataset contain phenological observations and growth data of 7 cherry, apricot and apple trees varieties and 5 peach trees varieties

<https://data.inrae.fr/dataverse/TEMPO>

Orphan Data Information System (SIDO)

SIDO Système d'Information pour les Données Orphelines | Inaki Garcia De Cortazar Alauri | Déconnexion

1.0.2

Les classeurs insérés

Nom du classeur	Nom d'utilisateur	Date d'insertion	Source de données	Actions
Phenoclim_AgroClim_INRAE.xlsx	Louis Tromel	11 sept. 2020	Phenoclim Agroclim INRAE	[Actions]
Phenoclim_AgroClim_Pro.xlsx	Louis Tromel	5 mars 2021	Phenoclim Agroclim Pro	[Actions]

+ Insérer un classeur

Classeurs modèles

Nom du classeur	Date d'insertion	Source de données	Actions
Phenoclim_AgroClim_INRAE_model.xlsx	8 sept. 2020	Phenoclim Agroclim INRAE	[Actions]
Phenoclim_AgroClim_Pro_model.xlsx	8 sept. 2020	Phenoclim Agroclim Pro	[Actions]

Fichiers paramètres

Nom du fichier	Date d'insertion	Source de données	Actions
Phenoclim_AgroClim_INRAE_model.xml	8 sept. 2020	Phenoclim Agroclim INRAE	[Actions]
Phenoclim_AgroClim_Pro_model.xml	8 sept. 2020	Phenoclim Agroclim Pro	[Actions]

<https://sido.pheno.fr>

- 13 datasets in TEMPO Dataverse
- Link via national Hubs with GBIF - [Global Biodiversity Information Facility](https://www.gbif.org/)
- Several on-going papers



Data rescue

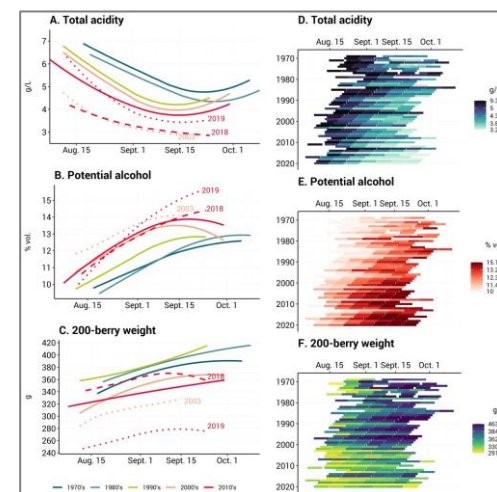
- **Fruit and forest trees**, INRAE Versailles Phenological Observatory 1929 -1970, 4747 observations
- **Forest trees**, Observatory of Saint Maur des Fosses 1875-1947, 180 species, 6187 observations
- **Maize**, INRAE, Variety data since 1937-1991, 100000 data
- **Annual crops**, INRAE, 1990 - 2015
- **Peach** (10 000 data) and **walnut** (10 000), INRAE – Technical PHENOCLIM data
- **Grapevine Grenache**, Institut Rhodanien, 1969 - 2021 Data Paper (Bécart et al., 2022)



And other data: Mont Ventoux dataset, Pine caterpillar, ticks...



<https://data.inrae.fr/dataverse/TEMPO>



- Intercalibration & training



Apple flowering

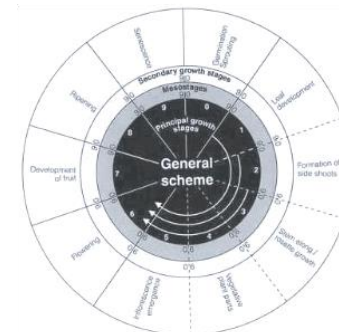
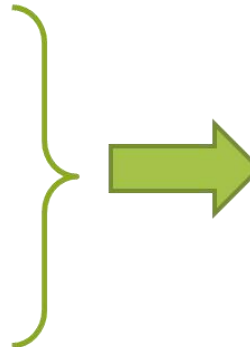
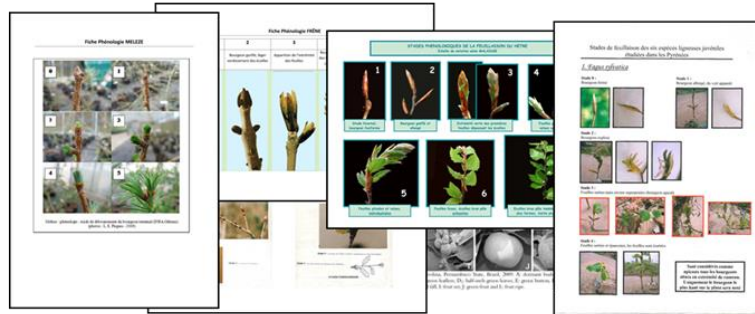


Maple budbreak

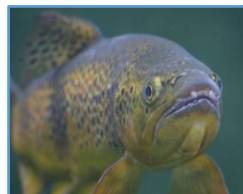


Grapevine budbreak

- Harmonising protocols – Use of common scales



BBCH Scale (Meier, 2001)



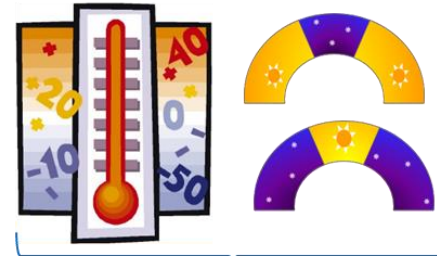
- Opening phenology blackboxes



Dormancy



Leaf senescence



Environmental determinisms



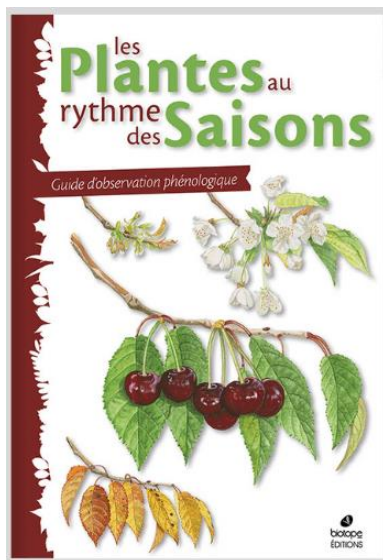
Genetic determinisms

- Sharing knowledge between scientific communities



... and Citizens

Exhibition: « Climat et Biodiversité: c'est chaud! »



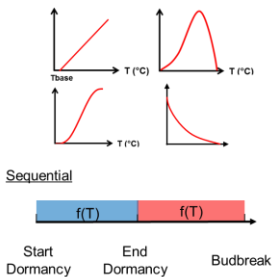
Phenology guide for temperate plants species in French, German and English



Free license exhibition: CC-BY-SA 4.0
Download and free distribution (~ 300)
<https://www.obs-saisons.fr/exhibitions>



Différent types des modèles (phenological process based models)



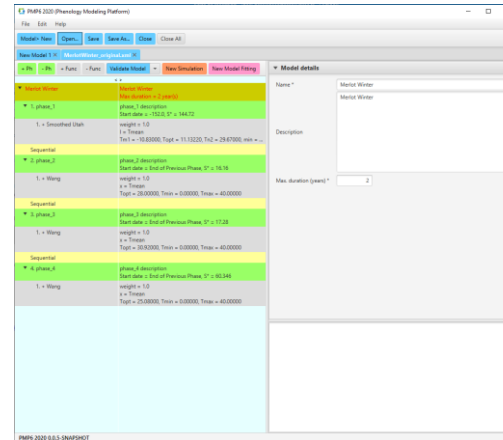
Different groups

- Chill- Forcing models
- Linear – Curvilinear
- Plants – Insects
- Biological (Erez)

Literature



PMP6

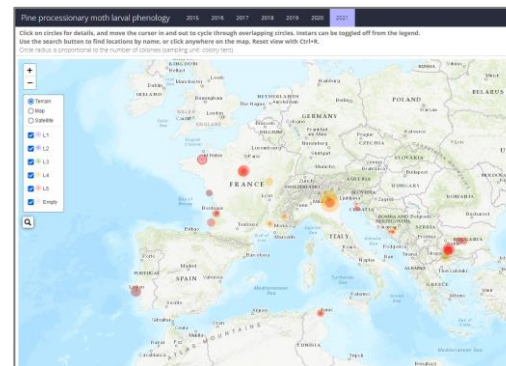


New optimisation algorithms

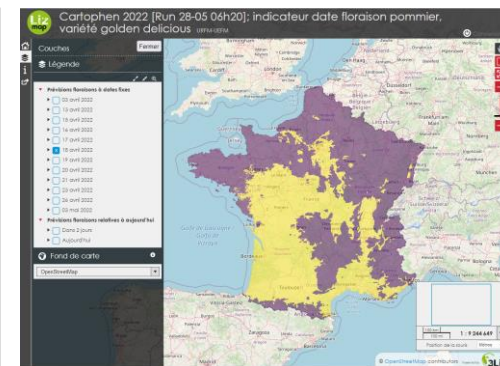
Phenoclimate Services



- **Services adapted to different species** (fruits trees, forest, crops, pests...), **different time-space scales** → **USERS committee**
- **Gitlab TEMPO**
- **Other methods to test and optimize models** : Deep Learning, Bayesian methods



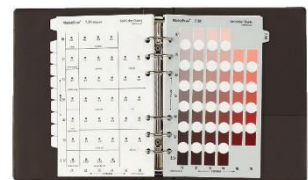
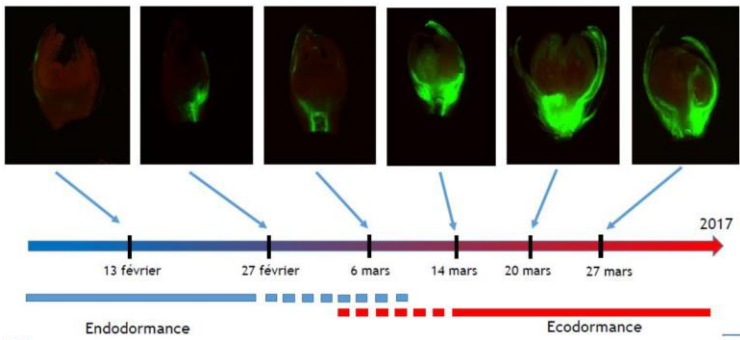
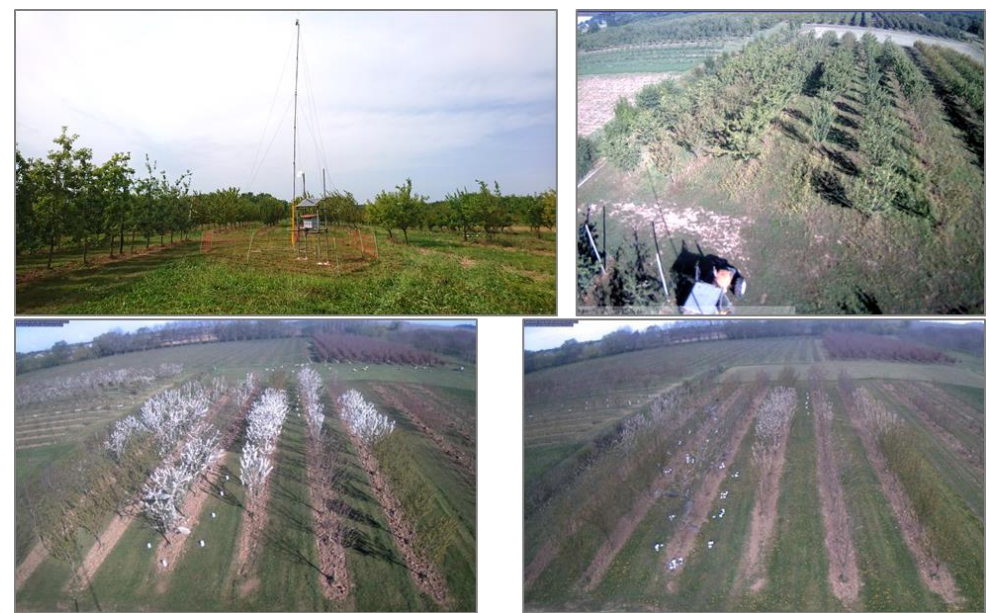
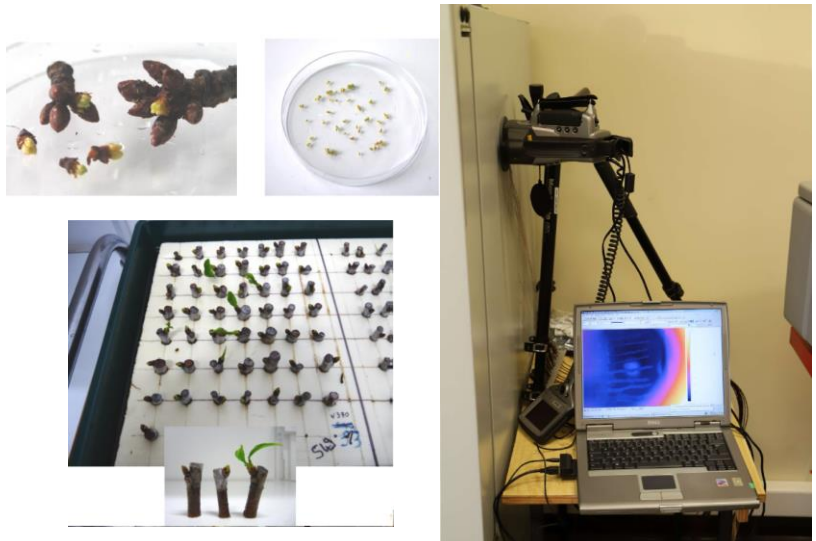
PCLIM



CartoPhen



Testing protocols and new techniques



Cf. Charrier, Wenden, Farrera, Chuine, Volaire...



Conclusion

- **TEMPO is a French network but open to collaborations with other countries**
- **TEMPO is willing to share its data with other information systems (licence constraints)**
- **Interactions between academics and citizen science programs are important for the dynamics of TEMPO**
- **TEMPO future project is to provide bioclimatic services**

Acknowledgments

