# National programme for the conservation of forest genetic resources in France

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## Introduction

Genetic diversity is a key component of biodiversity and allows species' adaptation in changing environments. Forest genetic resources (FGR) are the heritable materials maintained within and among tree populations that are of actual or potential economic, environmental, scientific or societal value.

Three levels of genetic diversity exist:

- Interspecific
- Intraspecific among forest stands = local adaptation
- Intraspecific among trees within stands

Human activities → GENETIC DIVERSITY / TIME

As a portfolio for adaptive strategies, genetic diversity needs to be preserved for current and future needs:

- Nowadays patrimonial diversity;
- Known diversity to answer actual threats (diseases, climate, …);
- Potential diversity not yet known but that could answer future threats.

France created 1991 + CRGF

National programme for conserving forest tree genetic resources

National Commission of Forest Genetic Resources

**What is the French strategy to conserve FGR ?**

CRGF is build on multi-actor engagement (Cf logos bellow) and proposes the national programme's major guidelines and priorities to the Ministry in charge of Forests.

## Material and method

Clones, seeds

**Static** → ***Ex situ* collections**

Used when maintaining big enough population is difficult due to sanitary crisis, habitat destruction, scattered distribution of rare species, etc.
Clones or seeds are taken from trees identified in natural environments and representative of genetic diversity of the species (Collin et al 2012).
Clonal archives are maintained *in vivo* and in cryobanks. No sexual reproduction occurs, thus genetic diversity conservation is static.

**Dynamic** → ***In situ* conservation units** (CUs) / ***Dynamic Ex situ***

Rarely used.
Diverse genetic material is planted to create a new population *ex situ* where sexual reproduction occurs and creates new genetic diversity with local adaptation.

**Used in priority.**

Management Charter

Signatories:
- Forest owner
- Forest manager
- CRGF

Is compliant with the requirements established at European scale (Koskela et al 2013) by EUFORGEN;

Guarantees, via an adapted management:
- A long term conservation,
- A sufficient genetic diversity in the population,
- An effective generation turn-over.

Contains general and locally specific guidelines, including structure of the CU:

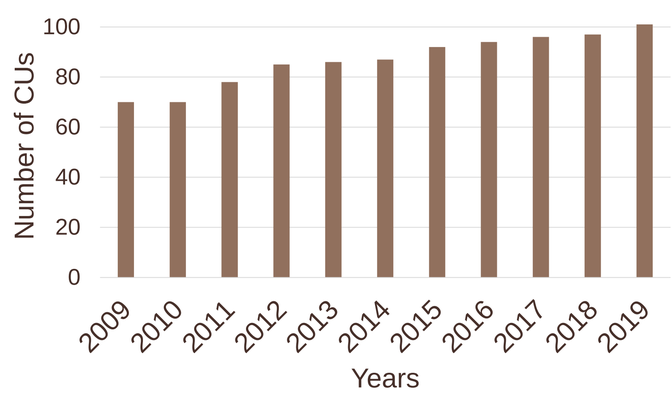
Buffer area: protects again pollen pollutions

Core area: must contain a sufficient number of reproductive trees in accordance to conservation goal*

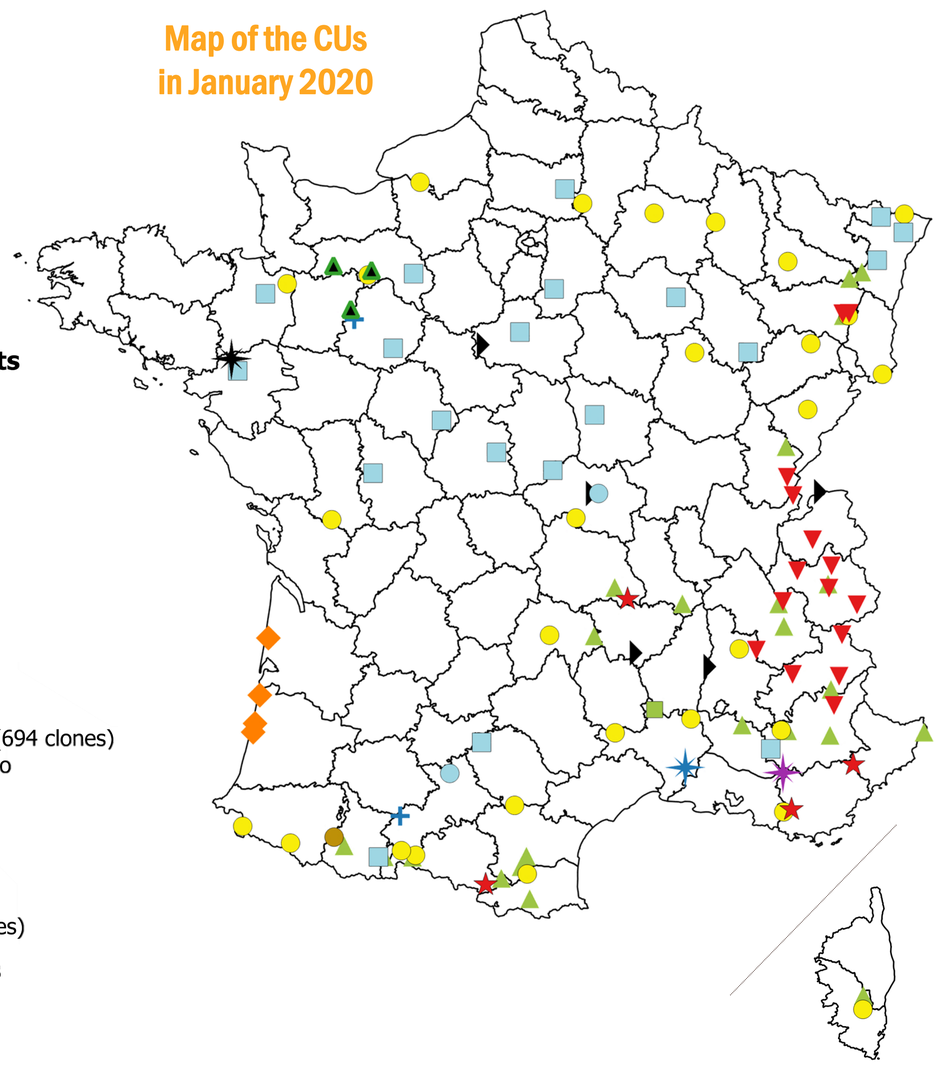
* 1- conservation global genetic diversity in big populations (min. 500 reproductive trees)
2- conservation of adaptive traits and/or specific phenotypes in marginal populations or disseminated of small size (min. 50 reproductive trees)
3- conservation of rare or threatened species, in very small populations (min. 15 reproductive trees)

## Results

**Dynamic of conservation units (CUs) creation during the last 10 years**




**Map of the CUs in January 2020**



**In-situ conservation units**

10 species
102 CUs

- Abies alba (23 units)
- Fagus sylvatica (28 units)
- Picea abies (15 units)
- Pinus pinaster (4 units)
- Pinus salzmannii (1 unit)
- Pinus sylvestris (4 units)
- Populus nigra (5 units)
- Quercus petraea (20 units)
- Ulmus glabra (1 unit)
- Ulmus laevis (2 units)

**Ex-situ collections**

6 species
1,648 clones

- ONF PNRGF Cadarache
  - Pinus nigra ssp. salzmanii (694 clones)
- ONF PNRGF Guéméné-Penfao
  - Juglans regia (58 clones)
  - Populus nigra (260 clones)
  - Prunus avium (251 clones)
  - Ulmus (341 clones)
- INRA-BELLEGARDE
  - Sorbus domestica (44 clones)

**Dynamic ex-situ devices**

2 species
5 units

- Abies alba (3 units)
- Prunus avium (2 units)

## Conclusion

Currently **13 species** are included within the **French conservation program** of forest genetic resources. This effort can be analysed using the new indicators on forest genetic resources established by EUFORGEN for the Ministerial Conference on the Protection of Forests in Europe (FOREST EUROPE) .
A reflection is in progress to **extend the existing networks** in a different way, aiming to include populations of interest for conservation from other species with limited extra resources: (i) to **conciliate CUs and protected areas networks** based on the IUCN category IV; (ii) to establish a **new type of conservation device**, targeting specific populations of interest; (iii) to **integer genetic conservation in a national strategy** on French FGR.

https://crgf.inrae.fr/