



**FORESTERRA**

Enhancing Forest RESearch in the MediTERRanean  
through improved coordination and integration



# Forestry Research Centre

CRA-SEL

[www.selvicoltura.eu](http://www.selvicoltura.eu)

Italian Agricultural Research Council



CONSIGLIO PER LA RICERCA  
E LA SPERIMENTAZIONE  
IN AGRICOLTURA

**Piermaria Corona**  
(Director)

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## 1 National Research Organization



**Agricultural research council**



**4 Departments**

**Forestry, environment, agronomy and landscape**

**3 more**

**15 Research Centres**

**Forestry research centre (+ 2 research units)**

**2 more**

**12 more**





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## Some facts about our institute:

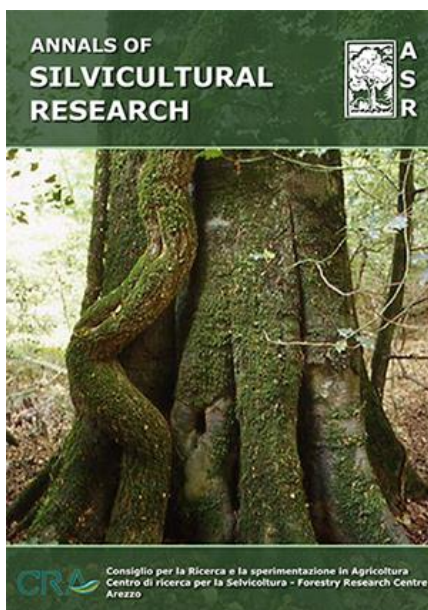
CRA - Consiglio per la Ricerca e la sperimentazione in Agricoltura – Rome ([WWW.entecra.it](http://www.entecra.it))

CRA DAF - Forestry, Environment, Agronomy and Landscape department

([http://sito.entecra.it/portale/cra\\_dati\\_organo.php?id=274&lingua=EN&tipo\\_org=dip&access\\_flag=0](http://sito.entecra.it/portale/cra_dati_organo.php?id=274&lingua=EN&tipo_org=dip&access_flag=0))

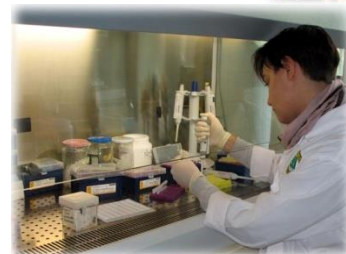
## **CRA SEL - Centro di ricerca per la selvicoltura (Arezzo, Italy)** **Forestry research centre**

<http://ojs-cra.cilea.it/index.php/asr/index>



## *priority research areas and objectives*

- ✓ theory and practice of silvicultural systems
- ✓ forest ecology, growth and monitoring
- ✓ forest biodiversity and selection/improvement of genetic resources
- ✓ forest biotechnology
- ✓ forest tree farming and agro-forestry systems
- ✓ advanced tools to support sustainable forest management (geomatics, ICT, ...)





## Main past and current projects

- **FP7 TREES4FUTURE (current)** - Integrative European Research Infrastructure project that aims to integrate, develop and improve major forest genetics and forestry research infrastructures
- **LIFE09 ENV/IT/000078 MANFORCBD (current)** - Managing forests for multiple purposes: carbon, biodiversity and socio-economic wellbeing (Partner) Resp. Az. Analysis, Design of forest management options
- **LIFE09 PProSpOT (current)**- Policy and protection of sporadic tree species in Tuscany forests
- **LIFE08 NAT/IT/000371 RESILFOR (current)** - Restoring silver fir forests
- **FutMon LIFE+ (2008-11)** - *Further development and implementation of a EU-level monitoring system (partner)*
- **EUFORGEN (2006)** - *Scattered broadleaves/Int. Biodiversity (formerly IPGRI) (Italian resp.)*
- **EUFORGEN (1996-06)** - *Noble hardwoods network/IPGRI (Italian resp.)*
- **FAO-Silva Mediterranea Rome (1996)** (Focal point)
- **FP6 Treebreedex (2006-2010)** - *A working model network of tree improvement for competitive, multifunctional and sustainable European Forestry (partner)*
- **UNECE-EC ICP-Forests, ICP-IM Reg. 1091/94 EC and CE 2152/2003 Forest Focus (1995-2006)** - *Pan-European level II Programme for the Intensive Monitoring of Forests Ecosystems*
- **AIR2-Medcop CT 94-0905 (1994-98)** - *Improvement of coppice forests in the Mediterranean region*



**FP7 TREES4FUTURE** - Integrative European Research Infrastructure project that aims to integrate, develop and improve major forest genetics and forestry research infrastructures

- **Integrative European Research Infrastructure project**

- **Aims:**

- integrate, develop and improve major forest genetics and forestry research infrastructures

- 28 Partners

- 36 work packages

- 4 thematic transnational infrastructure



## Genetics, Genomics and Tree Breeding

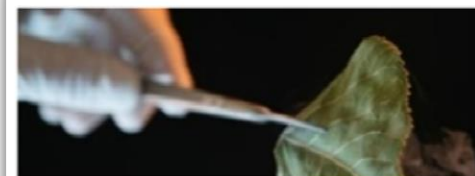


Image: AIT

## (Eco-)Physiology and Biotechnology



Image: Inga Nielsen, Fotolia

## Wood Science and Technology



Image: Victor Zastol'skiy, Fotolia

## Modelling / Data Analysis



Image: Forest map of Europe, EFI

## Work packages under which CRA-SEL is involved:

### WP 1 - Structuring and providing a common access to databases

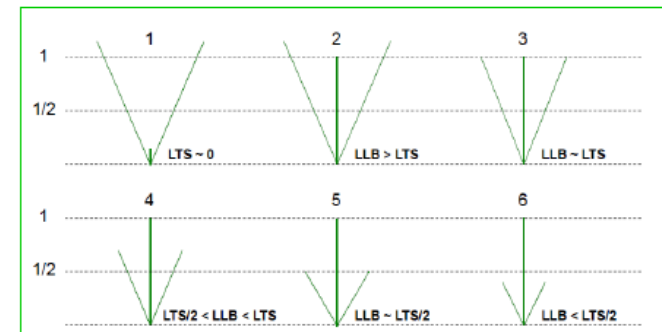
**Aim:** To structure and provide a common access to existing forest genetic databases

### WP2 - Creating common standards and protocols

**Aim:**

- To create common Standards and protocols for model species for traits assessment within and across scientific communities
- To inventory European reference genotypes for common experimentation (phenology, plasticity, genetic trials, etc.)

CRA-SEL is leader of wild cherry core group and for survey on drought resistance



Common protocol to assess apical dominance



### WP3 - Creating key thematic research networks

**Aims:** to create and develop key thematic networks for better integration of forest research disciplines and communities

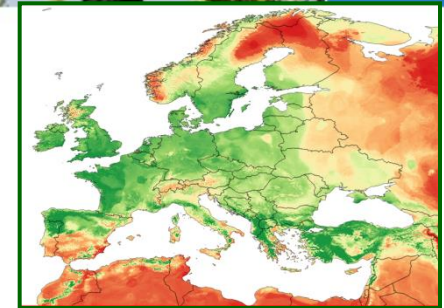
CRA-SEL is leader to D3.2: To build a network of experimental trials of forest species for the phenology assessment



## WP 8 - Spatial modeling of provenance regions and future site suitability matching

**Aim:** to develop the infrastructure for the spatial description of species and provenance based on site-based models and to make available climate matching tools for species and provenance selection in Europe

CRA-SEL is involved particularly for Douglas fir

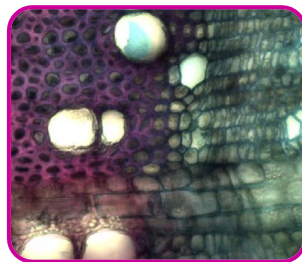


SDM for Douglas fir in Europe

## WP 11 - Enhancement and/or development of medium/high throughput phenotyping of traits

**Aim:** to evaluate the capacity of phenotyping techniques for various key-traits following several criteria (medium/high throughput, destructive or not, simplicity, cost, etc)

CRA-SEL investigate new techniques/methodologies to improve phenotyping capacity for common Italian and French wild cherry clones and larch. The survey involved CRA-SEL, INRA (France) and IBL (Poland). The phenotypic analysis of cambium are made in the CRA-SEL laboratories.



Wild cherry sample



Larch sample





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## LIFE09 ENV/IT/000078 MANFORCBD (current) -

Managing forests for multiple purposes: carbon, biodiversity and socio-economic wellbeing (Partner) Resp. Az. Analysis, Design of forest management options

- **Forest management testing, demonstrating and disseminating**

- **Aims:**

- test and verify in the field the effectiveness of forest management options to meet multiple objectives (including timber production, environment protection and biodiversity conservation)

- **10 Actions**

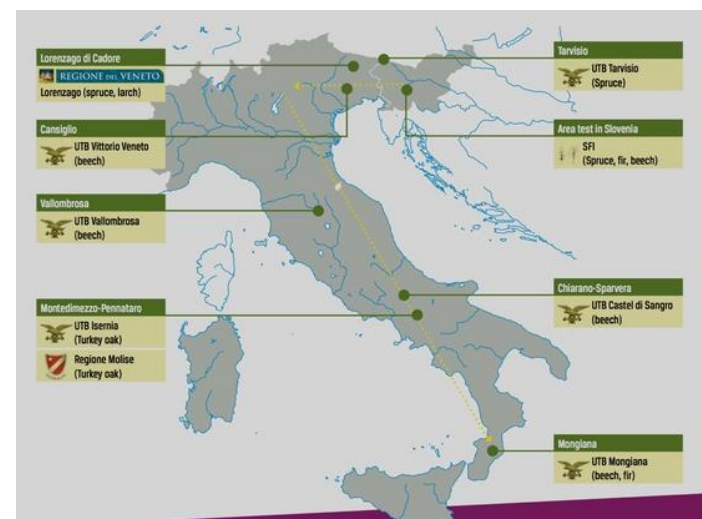
- **Multidisciplinary approach**

- Forest management (traditional and innovative)
- Biodiversity (birds, insects, flora, deadwood, ...)
- Carbon sequestration (all components)

6 partners – 2 EU countries



8 test sites



→ implementation of traditional vs. innovative silvicultural practices in beech forests from pre-alpine to Mediterranean environments and in alpine spruce forests



[www.manfor.eu](http://www.manfor.eu)



## Future perspectives in the forest research domain

✓ provide suitable and consistent solutions to changing markets (changes in consumption) and new opportunities for forest products and services under a global bioeconomy perspective

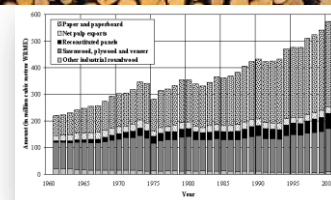
e.g.

- wood safety, wood security and the product and process innovations to make wood mobilization economically viable and environmentally sustainable
- geomatics and ICT to support sustainable forest management
- land suitability and land availability analyses and LCA for biomass forest tree crops

✓ provide suitable and consistent silvicultural solutions to manage resistance/resilience and adaptive ability of forest systems under global change conditions (vulnerability/mitigation/adaptation)

e.g.

- impact scenarios about forest tree migrations
- silvicultural potential for sustaining carbon sequestration
- management options to prevent/mitigate forest fire hazard
- silvicultural measures to contain the effects of extreme events (rainfalls, landslides, pest outbreaks, ...)



**wood  
safety**

**wood  
security**

certification / law  
enforcement

quality

sustainability

mobilization

equity

efficiency

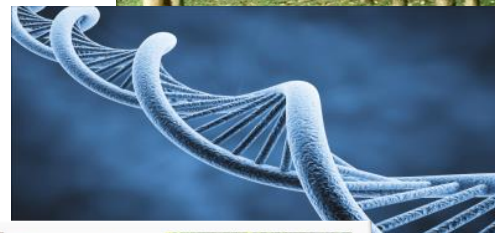


## Future perspectives in the forest research domain

✓ provide suitable and consistent solutions by taking advantage of forest genetics potential

e.g.

- selection of traits and forest reproductive materials for adaptation of forest ecosystems to the environmental changes
- developing methods of assisted forest tree migration
- genetic engineering to improve the use of forest trees (notably, poplars) for bioenergy crops
- innovative methods of breeding for enhancing productivity, wood quality and environmental performances
- forest tree biotech to support phytoremediation

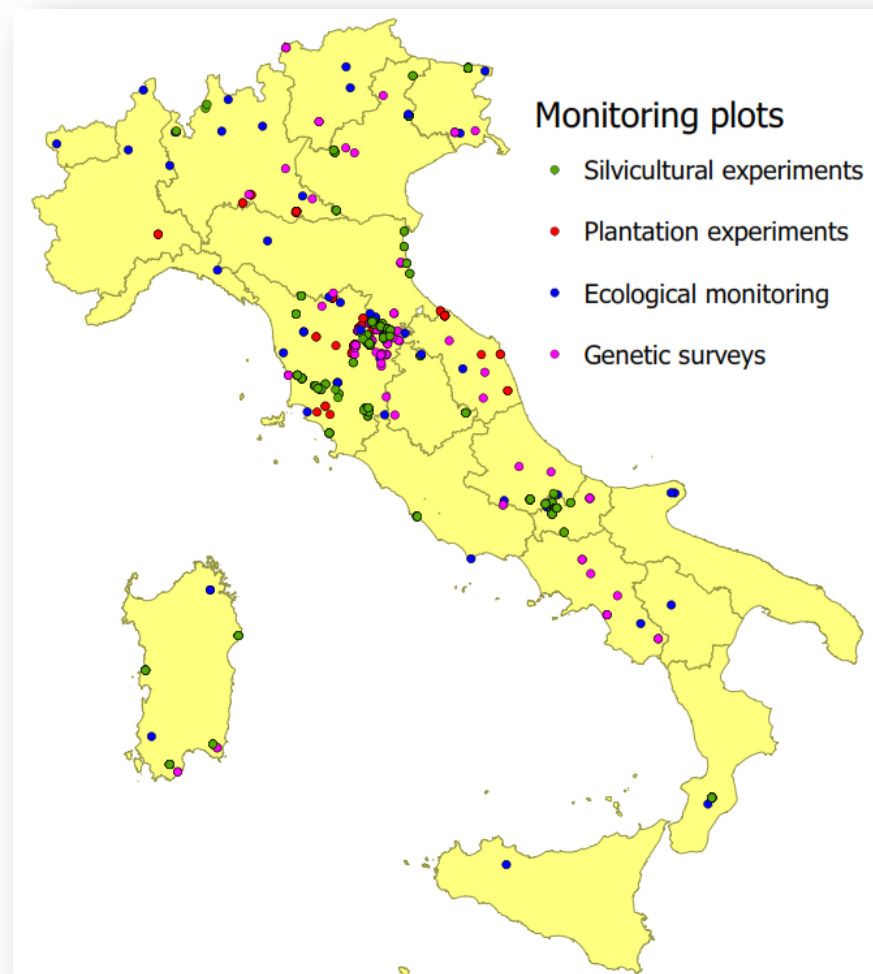




## Forest research infrastructures:

- more than 800 permanent plots,  
under four research themes:

- silvicultural experiments
- forest tree cropping experiments
- forest ecological monitoring sites
- genetic survey sites



## Forest research infrastructures:

### main laboratories:

- *Dendroecology*

- dendrocronograph LEGA SMIL3 and Velmex Inc. System, lab facilities

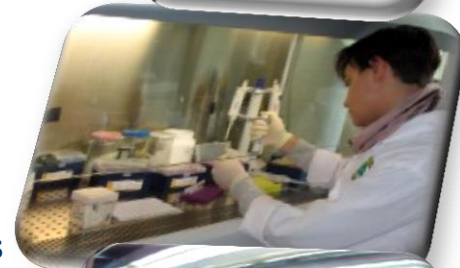
- *Forest ecology*

- LAI-3000 Leaf area meter, LAI-2000 Plant Canopy Analyzer, Digital cameras, AccuPAR ceptometers, Solarimeters, Pyranometers, IMKO TRIME, Licor LI-1600 Steady State Porometer, Scholander Pressure Chamber, Chlorophyll Meter SPAD (Minolta Inc) and CCM-200 (Apogee Instr.), Spectroradiometer EPP200 (Stellarnet Ic)

- *Forest genetic resources*

- dendrochronograph LINTABTM6 Rinntech, and related software programs for the acquisition and analysis of images, optical microscope AXIOLAB equipped with AXIOCAM IC Carl Zeiss and related software programs for the acquisition and analysis of images, 2 PCR: Thermal Cycler PTC- 200 DNA Engine Cycler, e Mastercycler pro S Eppendorf, 1 sequencer ABI PRISM 310

- *Forest geomatics* (under development)



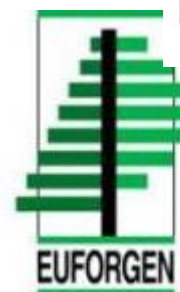


## Transnational collaborations (networks)

1. IUFRO, EFI, FAO Silva Mediterranea
2. EUFGIS/Bioversity International
3. EUFORGEN/Network on Forest Reproductive Materials
4. ICP-Forests: Intensive monitoring of forest ecosystems
5. COST action FP1206 - EuMixFor European Mixed Forests
6. COST action FP1202 MaP FGR - Strengthening conservation key issue for adaptation of marginal/peripheral populations forest trees to climate change in Europe
7. Informal network at present: chestnut coppices for high quality timber production all over the Europe



**EUMIXFOR**  
Cost Action





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## Transnational collaborations (Institutes)

### International

FAO, EFI-mountfor, WSL (Switzerland), CSIRO (Australia), UBC (Canada), Natural Resources (Canada)

### European

Slovenian Forestry Institute (Lubjiana), SLU (Umea)

### National

- Italian National Research Council (CNR), University of Bologna, University of Firenze, University La Sapienza (Rome), University of Molise, University of Sassari, University of Tuscia (Viterbo)
- Italian National Forest Corp (CFS) and Regional Forest Services





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## Transnational collaboration

### Which is your interest in creating Transnational Joint Research Units?

- ✓ to obtain and exchange skill and be more effective in producing and disseminating innovative research
- ✓ to concentrate and valorize each national expertise on common topics in order to promote silviculture and sustainable management of Mediterranean and Alpine forests
- ✓ main current interest is on adaptive forest management (practices conceived as learning experiments, systemic silviculture), framed under different contexts, as concerns forest types and socioeconomic conditions, and under a global bioeconomy perspective

### Which are the positive outputs you expect from this type of collaboration?

- exchange of knowledge from different working cultures, international project participation (submission of competitive proposals), LT&STSM for young researchers

### Do you identify any drawback?

- bureaucracy
- short duration of research projects (look for funding sources to support silvicultural research on a medium/long-term basis)



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not all that can be counted counts,  
not all that counts can be counted  
(Einstein)

Networking Workshop. Marseille, France, 12-13 December 2013