



COST Action FP1202

**Strengthening conservation: a key issue for
adaptation of marginal/ peripheral populations of
forest trees to climate change in Europe (MaP-FGR)**



2015 TRAINING SCHOOL

**Forest genetic resources of marginal populations of forest trees
at the altitudinal ranges**

REPORT

**31 August – 4 September 2015,
Centro Studi Alpino, University of Tuscia
Pieve Tesino, Italy**



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The 2015 Training School was hosted by the *Centro Studi Alpino* in Pieve Tesino (Valsugana valley), belonging to the University of Tuscia (Viterbo). The *Centro Studi Alpino* is nearly 50 km from the town of Trento, in the margins of the Dolomites region which is also one of most important regions for the forestry tradition in the Italian Alpine range.

The location revealed to be the right place for the topic of the week. The field trip, organized immediately after the lectures on basic concepts, was a useful tool to see practical examples and introduce concepts of the following days. Moreover it acted as icebreaker for trainees and trainers.

This year the attendance at the school was dominated by trainees from Eastern European countries, as well as two trainees were from Tunisia and one from Indonesia (but working at the University of Copenhagen). The level of their scientific background (most of them are PhD) and so of the presentations showing their research were judged by trainers as of high quality.

Nine of the trainees were women, confirming the trend observed also in the framework of the Action, where women are very active and relatively numerous.

Regarding the geographic distribution of trainers, they were mostly Italians, partially due to the need of having local Alpine experts and partially due to last-minute cancellations.

Another important positive consideration is that also the age balance has been improved among trainers: the presence of a senior forestry officer, well-known forest ecologist and silviculturist, fascinated with his knowledge and explanations also in the field and the youngest trainer, just concluded his PhD.

Finally, a stakeholder was involved as a trainer, invited to talk about the management of a National Park in the Alps in view of the effects of climate change.



COST Action FP1202

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LIST OF TRAINEES AND TRAINERS

	Name	Surname	Email	Country	Institution	Role
1	Giovanbattista	de Dato	g.dedato@entecra.it	Italy	Forestry Research Centre (CRA-SEL)	Trainee
2	Elżbieta	Chomicz	E.Chomicz@ibles.waw.pl	Poland	Department of Mountain Forests, Forest Research Institute in Poland	Trainee
3	Krista	Kanberga-Silina	bergamonte@gmail.com	Latvia	Estonian University of Life Sciences, Forestry department	Trainee
4	Marius-Ion	Manea	mariusion.manea@yahoo.ro	Romania	University of Agricultural Sciences and Veterinary Medicine of Banat Region "King Michael I of Romania", Timisoara	Trainee
5	Mahardika	Putra Purba	mpp@ign.ku.dk	Indonesia / Denmark	Forest Genetics and Diversity, Department of Geosciences and Natural Resources Management, Faculty of Science, Copenhagen	Trainee
6	Milan	Gazdić	gazdic.milan@gmail.com	Montenegro	University of Belgrade, Faculty of Forestry and Albert-Ludwigs University (Freiburg, Germany)	Trainee
7	Michał	Adamus	m.adamus@ur.krakow.pl	Poland	University of Agriculture in Krakow, Faculty of Forestry	Trainee
8	Barbara	Correia	bscorreia@ua.pt	Portugal	University of Aveiro	Trainee
9	Lamia	Hamrouni	hamrounilam@yahoo.fr	Tunisia	National Research Institute of Rural Engineering Water and Forestry (INRGREF) IRESA-University of Carthage	Trainee
10	Srdjan	Pejovic	srdjanpejovic82@gmail.com	Montenegro	Forest Ecology and environmental improvements Faculty of Forestry in Belgrade, Serbia	Trainee
11	Jelica	Gazdić	gazdic.jelica@gmail.com	Montenegro	Faculty of Forestry in Belgrade, Serbia	Trainee
12	Monika	Raskauskaite	m.raskauskaite@gmail.com	Lituania	Lithuanian Research Centre for Agriculture and Forestry. Forest Research Institute	Trainee
13	Faten	Mezni	faten-mez@hotmail.com	Tunisia	Rural engineering, Water and Forests and National Institute of Agronomy	Trainee
14	Slavica	Papić	papic.papeslavica@yahoo.com	Czech Republic	Faculty of Forestry and Wood Technology, Mendel University in Brno	Trainee

COST Action FP1202

Strengthening conservation: a key issue for adaptation of marginal/ peripheral populations of forest trees to climate change in Europe (MaP-FGR)



1 5	Marta	Kempf	m.kempf@ur.krakow.pl	Poland	Department of Genetics and Forest Tree Breeding, Faculty of Forestry, University of Agriculture in Krakow	Trainee
1	Fulvio	Ducci	fulvio.ducci@entecra.it	Italy	Forestry Research Centre, CREA	Director of the school
2	Maria Cristina	Monteverdi	mcristina.monteverdi@entecra.it	Italy	Forestry Research Centre, CREA	Trainer
3	Giovanni Giuseppe	Vendramin	vendramin@fi.cnr.it	Italy	Institute of Biosciences and BioResources, Division of Florence, National Research Council	Trainer
4	Maurizio	Marchi	maurizio.marchi@entecra.it	Italy	Forestry Research Centre, CREA	Trainer
5	Marco	Lauteri	marco.lauteri@ibaf.cnr.it	Italy	Istituto di Biologia Agroambientale e Forestale (IBAF) - Cnr	Trainer
6	Alessandro	Ducoli	alessandro.ducoli@parcoadamello.it	Italy	Adamello Regional Park	Trainer
7	Pietro	Piussi	pietro.piussi@gmail.com	Italy	Forestry expert, formerly Chair of Silviculture at the University of Florence	Trainer
8	Rakefet	David-Schwartz	rakefetd@volcani.agri.gov.il	Israel	Institute of Plant sciences, Agricultural Research Organization, Volcani Center, Bet Dagan	Trainer



COST Action FP1202

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TRAINING SCHOOL AGENDA

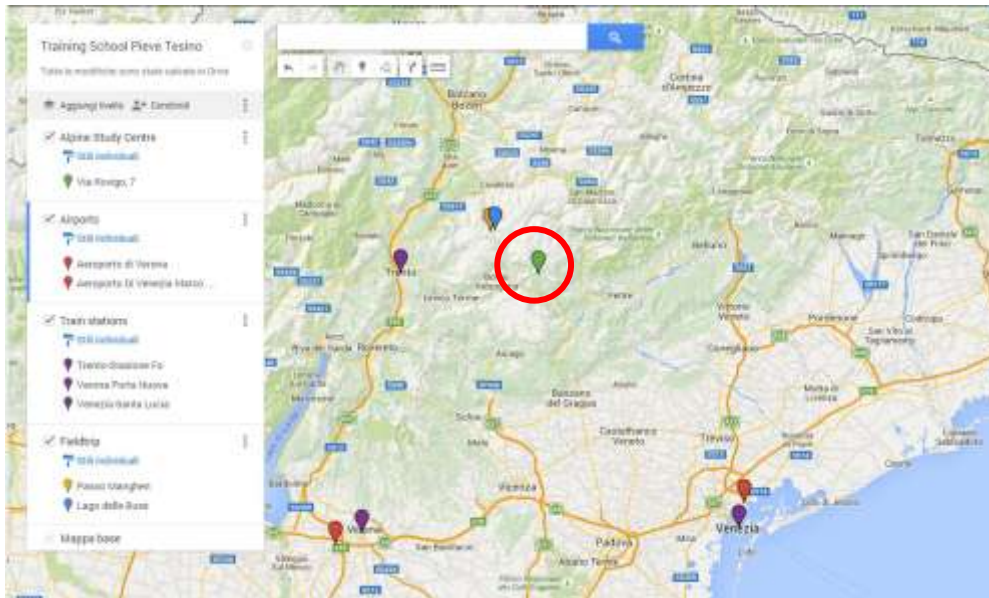
COST Action FP1202 MaP FGR TRAINING SCHOOL 2015 Forest genetic resources of marginal populations of forest trees at the altitudinal ranges						
31/08/2015			01/09/2015	02/09/2015	03/09/2015	04/09/2015
09:30	Welcome and introduction to the school	09:00	field trip	Presentation of Cost action FP1202 V. Garavaglia	Marginality concepts from climatic and geographic point of view. MaPs distribution modelling (practical exercises) M. Marchi	Adaptation mechanisms R. David-Schwartz
10:00	coffee break	09:30				
10:30		10:00		coffee break	coffee break	coffee break
11:00	Forest population genetics and introduction to MaP populations	11:00		Sylviculture and anthropogenic impact on the Alpine stands P. Piusi	Marginality concepts from climatic and geographic point of view. MaPs distribution modelling (practical exercises) (continuation) M. Marchi	Stable isotopes - theoretical basis and applications M.C. Monteverdi
11:30		11:30				
12:00	G. Vendramin	12:00		lunch	lunch	lunch
12:30		12:30				
13:00	lunch	13:00		Dynamics of forest Alpine communities in the context of climate change A. Ducoli	Forest reproductive material in the context of shifting climatic zones F. Ducci	Stable isotopes - theoretical basis and applications M. Lauteri
13:30		13:30				
14:00		14:00		coffee break+ Trainee's presentation	coffee break+ Trainee's presentation	coffee break+ conclusions
14:30	Genetics of MaP at the leading and rear and altitudinal edges	14:30				
15:00		15:00				
15:30	G. Vendramin	15:30				
16:00	coffee break	16:00				
16:30		16:30				
17:00	Trainee's presentations	17:00				
17:30		17:30				

COST Action FP1202

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The training School has been organized in collaboration with the *Centro Studi Alpino* (<http://www.centrostudialpino.unitus.it/>) of University of Tuscia on 31 August-4 September 2015.



Location of the Training School (Pieve Tesino)

Lectures on the topic *'Forest genetic resources of marginal populations of forest trees at the altitudinal ranges'* were covered by TS trainers (F. Ducci, G. Vendramin, M.C. Monteverdi, M. Marchi, P. Piussi, R. David-Schwartz, M. Lauteri, A. Ducoli) experts on genetics, forest reproductive material management, Silviculture in Alpine regions and historical and social aspects, forest management in protected areas, genomics of adaptation, ecophysiology.

In detail the topics covered in the lectures and according to the program of the Training School were the following:

- **Forest trees and Climate changes in Mediterranean ecosystem/species. Genetic structure (including spatial structure) Demography Selection Bayesian clustering ABC (DIYABAC), G. G. Vendramin.**
 General topics on Climate change and tree populations, Predictions for the Mediterranean region, Local adaptation in Mediterranean trees?, Migration potential, What is phylogeography? Database of genetically depauperate plants, Fragmented distribution range, Association studies.
- **Definitions of Forest MaP Populations , F. Ducci**
 Isotherm shift, changes at environmental level, Problems to the mesic forests, Value of the MaP FGR, Margins in the range, Human activities effects, Definition of core range, rear edge, leading edges, examples.



COST Action FP1202

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- **Forest Reproductive Materials in the context of shifting climatic zones and use of field tests, F. Ducci.**
The OECD Scheme on FRM, the EU Directive 1999/105/CE , Terminology, Concept and principia, advantages from legislation to the proper use of MaP FGR, Provenance Regions and Climate change effects, the shift of PR, Migration, Efficiency of responses to face the present rapid CC, The role of the forest nursery system for managing variation and preserving diversity, Study cases.
- **Marginality concepts from climatic and geographic point of view - MaPs distribution modeling -, M. Marchi**
Species Distribution Modelling or Ecological Niche Modelling?; Marginality detection at geographic and/or climatic level; Predictive variables for SDMs and species occurrence; SDM evaluation and most common SDM algorithms; A practical example with R.
- **Stable isotopes – Teoretical bases, M. Lauteri, CNR – Institute of Agroenvironmental and Forest Biology**
Stable isotopes and plant physiology: water use and water-use efficiency; Some applications of stable isotopes with implications on climate change and resilience: meta-populations and phenotypic plasticity and the ecosystem scale; Perspectives in time and space: the dendro-isotopic approach; Trying to link stable isotopes and landscapes: the ISOSCAPES.
- **Stable isotopes applications, M.C. Monteverdi**
Intra specific adaptive mechanisms to climate change (drought conditions) in *Castanea sativa* Mill.; Changes of tree rings $\delta^{13}\text{C}$ at the southern range-edge of *Fagus sylvatica* L.
- **Adaptation and mechanisms of stress resistance, R.David Schwartz.**
Forest trees are experiencing abiotic stresses that are part of their long-lasting life at the forest in different ecosystems. The tree response to stress is determined by the ontogenic stage of the tree and by the combination of stressed encountered. Global climatic changes led to drought being a major stress that trees face. Drought leads to tree mortality by various mechanisms, and xylem dysfunction (cavitation) has been shown to be a major cause. A case study of intra-specific variation of resistance to cavitation was discussed

Trainees' Workshop

During the week, some hours a day were dedicated to give the trainees the opportunity to present an overview of their research, research achievements and interests in 10' presentations that were followed by short discussion and questions. During the sessions the trainees had the opportunity to discuss issues related to their research with the trainers and get advice on how to proceed more efficiently with their work and also receive questions regarding their research from the their colleagues:



COST Action FP1202

Strengthening conservation: a key issue for adaptation of marginal/ peripheral populations of forest trees to climate change in Europe (MaP-FGR)

- “Linking ‘omics and ecophysiology in Eucalyptus: unravelling stress tolerance in a forest species”, Barbara Correia
- “Valorization of *Pistacia lentiscus* seed oil”, Faten Mezni
- Analysis of the role of genetic factors in ash dieback associated with *Hymenoscyphus fraxineus*, (anamorph *Chalara fraxinea*, T.Kowalsky), Slavica Papic
- “Population and ecological genetics of a tropical tree, *Eusideroxylon zwageri* Teijsm&Binn. in a tropical lowland rainforest ecosystem, Indonesia”, Mahardika Putra Purba
- “Ecological distribution and site of *Abies alba* in North of Montenegro”, Milan Gazdic
- “Whether genetic resources of Norway spruce in the Beskids will be retain in the next generation of forest stands?”, Elzbieta Chomicz
- “Edaphic-vegetation characteristics of forests in the National Park “Lovćen””, Jelica Gazdic
- “Investigating ecophysiological processes of "extreme" ecosystems, characterised by some ecological limitation for water, temperature, nutrients”, Giovanbattista de Dato
- “Ecological distribution and site conditions of *Pinus heldreichii* forests in management unit “Štitovo” on Maganik mountain”, Srdjan Pejovic
- “Subalpine forest dynamics, coarse woody dynamics and other research interests”, Michal Adamus

FIELD TRIP

On Tuesday, September 1, 2015 a field trip was organized to visit high-altitude marginal populations. The destination was the Lago delle Buse (2 065 m a.s.l.) at Passo Manghen (2 047 a.s.l.).



Lago delle Buse

Lago delle Buse is a Site of Community Importance (SCI) that can be reached with a short (40') walk from Passo Manghen. It is located in an ancient glacial valley in the central-western part of Lagorai Chain and the landscape is characterized by a strong human influence.



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The prairies surrounding the lake are nowadays used for grazing and tourism purposes. Those abandoned by human activities are being colonized by forests dominated by *Picea abies*, *Pinus cembra* and *Larix deciduas* mixed with *Pinus mugo* and small trees as *Sorbus aucuparia* and shrubs as *Vaccinium myrtillus* and *Rhododendron ferrugineum*..

From a geomorphological point a view the lake has a glacial origin because the frontal moraine of the small glacier originated in the past from Monte Ziorela (2 478 m a.s.l.) created a dam and contributed in the origin of the water basin. A layer of impermeable porphyric rocks belonging to Monte Ziorela formed the bottom of the lake due to slope processes.

Pieve Tesino, September 5, 2015



Training School Director
and Chair of the Action
CREA – Forestry Research Centre,
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COST Action FP1202

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