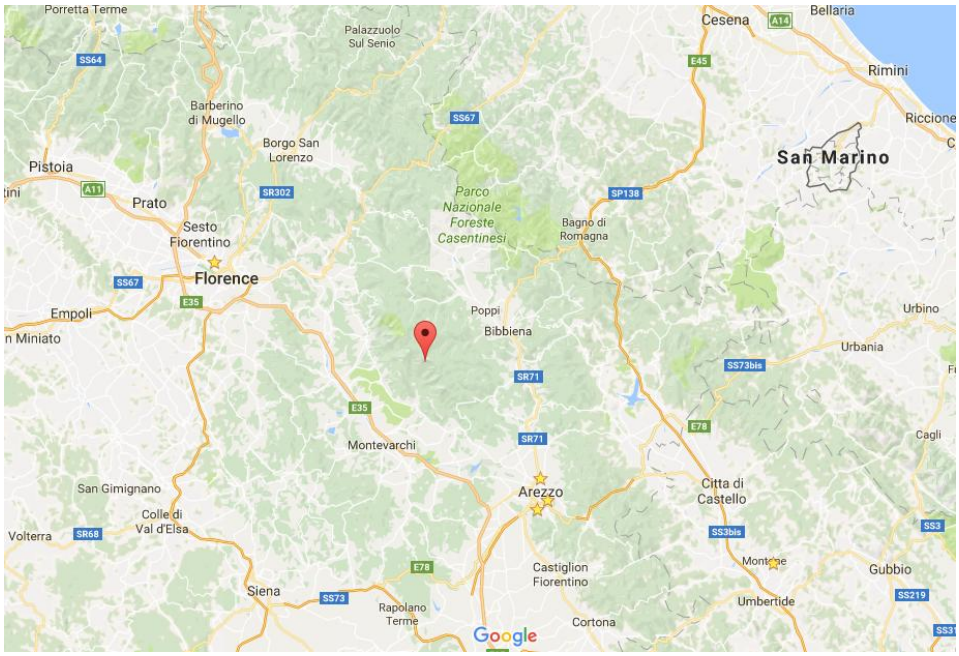
COST Action FP1202: Strengthening conservation: a key issue for adaptation of marginal/ peripheral populations of forest trees to climate change in Europe (MaP-FGR)

Marginal and peripheral tree populations: a key genetic resource for European forests

26 September 2016 – 29 September 2016
Host: Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA SEL)
Venue: CREA SEL, Viale Santa Margherita 80, 52100 Arezzo (Italy)

FIELDTRIP
28th September 2016

Pratomagno is a ridge between the upper Arno Valley and Casentino, in the north-west of Arezzo.

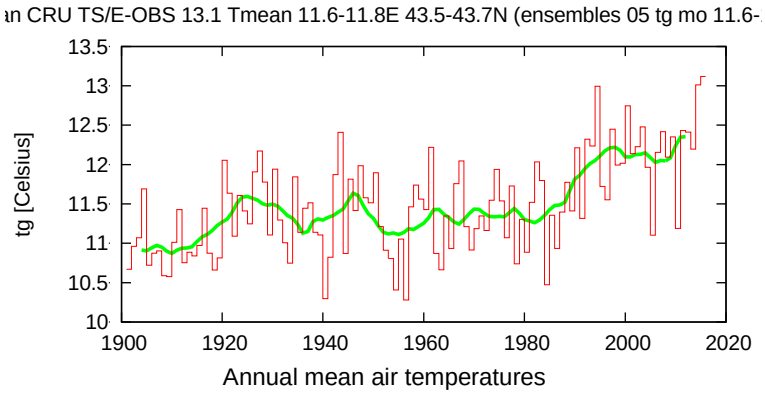


The peak is 1592 m a.s.l, named Croce di Pratomagno.
The area is mainly covered by beech forests (32%), oak forests (20%, *Quercus cerris* and *Q. pubescens*), black pine forests (17%), chestnut (12%), a small portion by white fir (6%) and Douglas fir (6%).
An important part of Pratomagno is protected under the Site of Communitary Importance SCI and Special Protection Area IT518001 "Pascoli montani e cespuglieti del Pratomagno" (Mountain meadows and shrublands of Pratomagno), object of the project LIFE Natura NAT/IT/7239 "Conservazione delle praterie montane dell'Appennino Toscano" (Conservation of mountain meadows of Tuscan Appenine) (2001-2005).

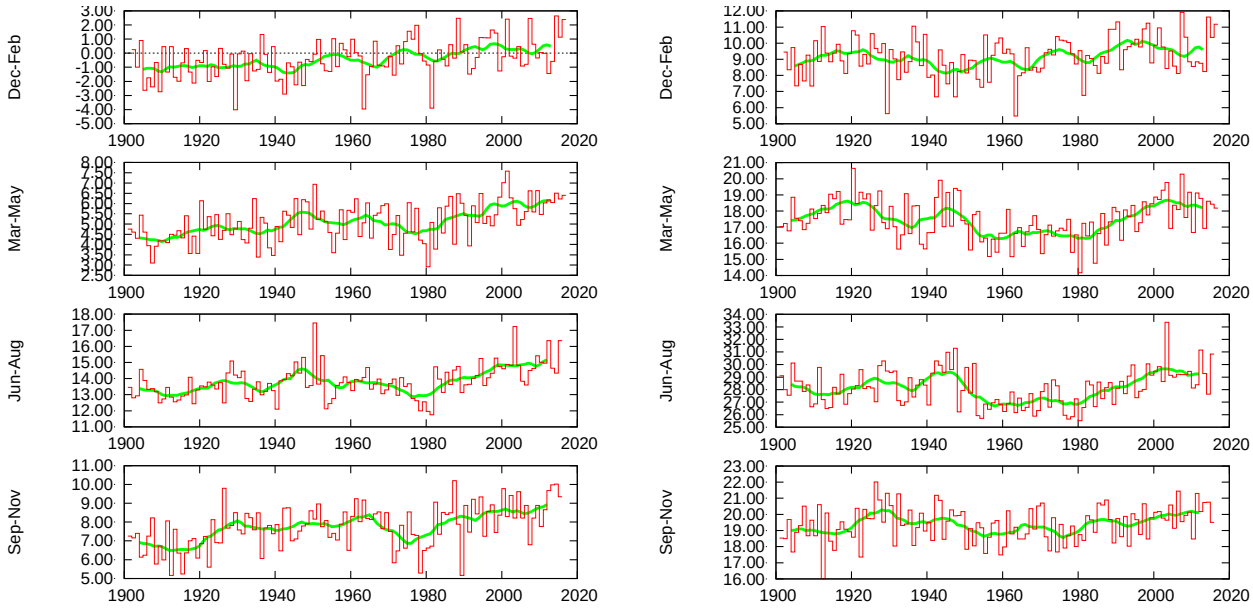
The area is mainly characterized by Inceptisol at higher slopes, while in more fertile and evolved stations the soil is Alfisol.

The dominant geologic substrate of Pratomagno, which arose from the sea 5 yrs BP, is sandstone gradeted with siltite and argillite

The climate of the area is classified as temperate mesothermal according to Koppen classiffication. The mean annual temperature is 10.5° C (19 °C in July, 1.5 °C in January). Rain is unevely distributed, with the absolute maximum in autumn and a relative maximum in spring; summer is relatively dry (summer precipitation < 150 mm) with minimum in July.
Based on the data available on the web application KNMI Climate Explorer (http://climexp.knmi.nl/), past climate (time series 1901-2015) analysis revealed a significant positive trend of air temperature.

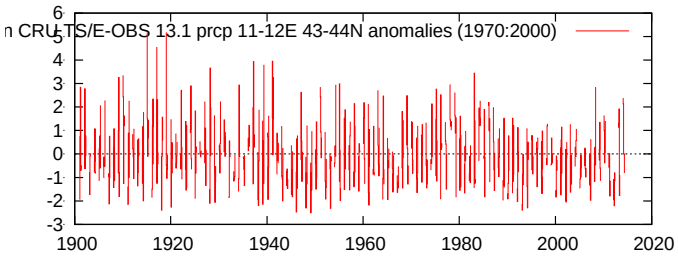


This increase was mainly due to the increase of the minimum temperatures, whose rate was on average about threefold the rate of maximum temperatures. The positive change of minimum temperatures was significant in all seasons, but it was particularly evident in winter and autumn. Less evident but still significant changes were detected for the maximum temperatures only in winter.



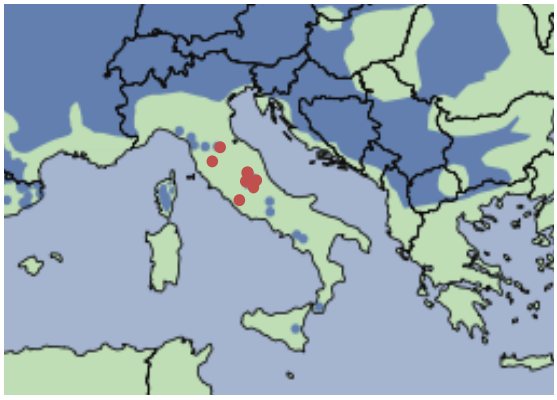
Annual averages of minimum (left) and maximum (right) air temperatures by season

A not clear trend was shown by precipitation.



Annual precipitation anomalies with respect to the annual cycle of the period 1970-2000

This location has been selected for the presence of abundant individuals of birch, as part of the seven locations sampled so far for studying the marginal and peripheral birch populations along the Appenine in Italy. In the map below, the distribution range of silver birch in Southern Europe is reported; the red dots show the locations sampled for studying the population structure of birch along the Appenine in Italy.

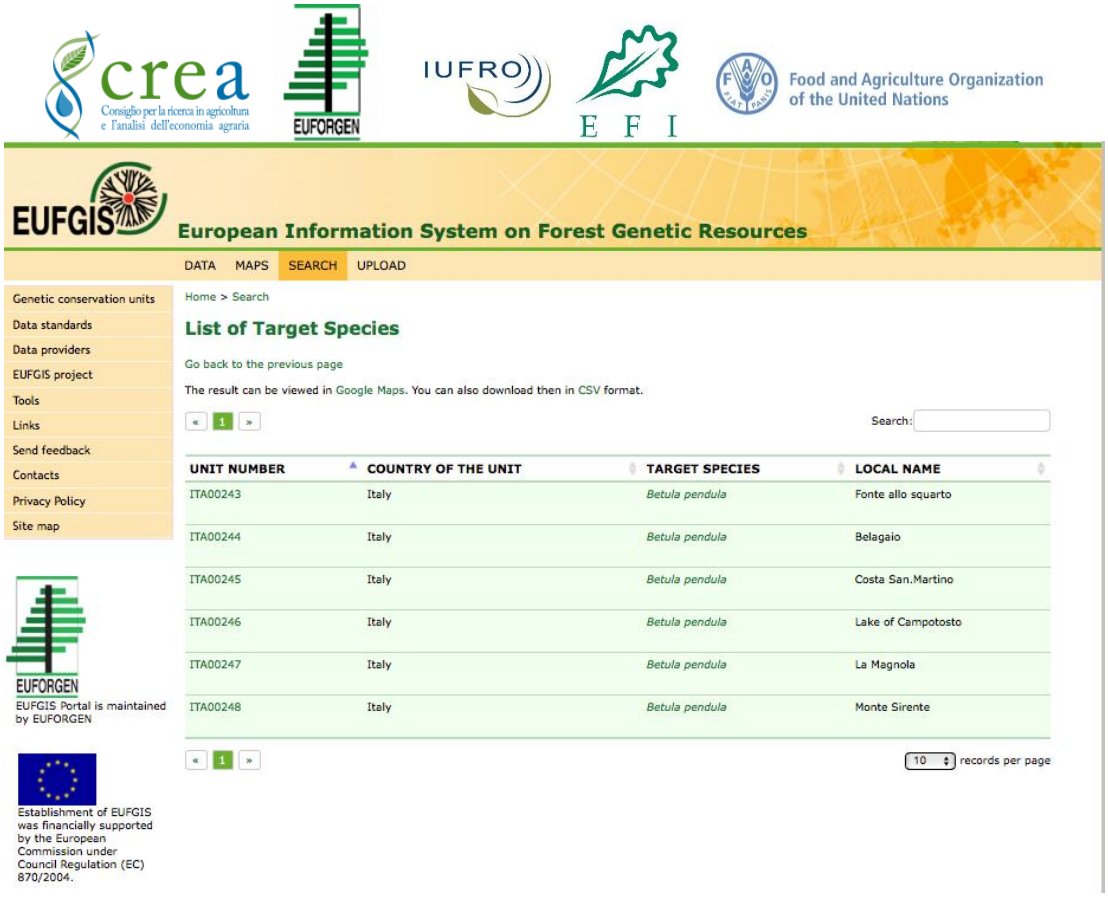


Population name	Label	Coord N	Coord E	alt (m)
Pratomagno	PTM	43.6116	11.71139	1070
Riserva Naturale di Stato del Belagaio	BLG	43.07906	11.19843	460
Monti della Laga - Amatrice	MLA	42.67171	13.31173	1330
Lago di Campotosto	CMT	42.53909	13.39772	1380
Monte Sirente	MSR	42.15613	13.6205	1500
Monte Velino	MVL	42.14387	13.4907	1550
Caldara di Manziana	CMZ	42.0893	12.09738	260

The site (N 43.61, E 11.71) is in the municipality of Talla, locality Fonte allo Squarto, with a mean altitude of 1070 m a.s.l.

The wood is a mixed coppice forest with chestnut (*Castanea sativa*, 60% of the stand basal area), silver birch (*Betula pendula*, 26%) and beech (*Fagus sylvatica*, 13%), wild cherry (*Prunus avium*) is sporadic.
The mean diameter of birches is 19.6 cm, and the mean height is 16.5 m, reaching the dominant and sub-dominant canopy layer. They are regularly scattered on a ~10 ha area and present a good vigor; seedlings are scarce.

The birch population was registered in the Eufgis database http://portal.eufgis.org/data/ together with the other marginal populations.



The birch populations of Pratomagno, similarly to the others, presented a low diversity. At the opposite, differentiation was very high, revealing the tendence to unrelatedness of these marginal and peripheral birch populations at their Southern Italian limits.

According to STRUCTURE analysis, the Italian birch populations were separated in five different gene pools.