

# Ecological characterisation of *Taxus baccata* occurrence in Elba island

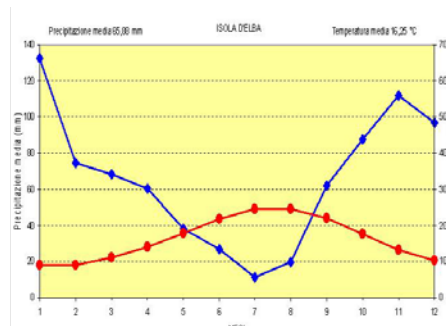
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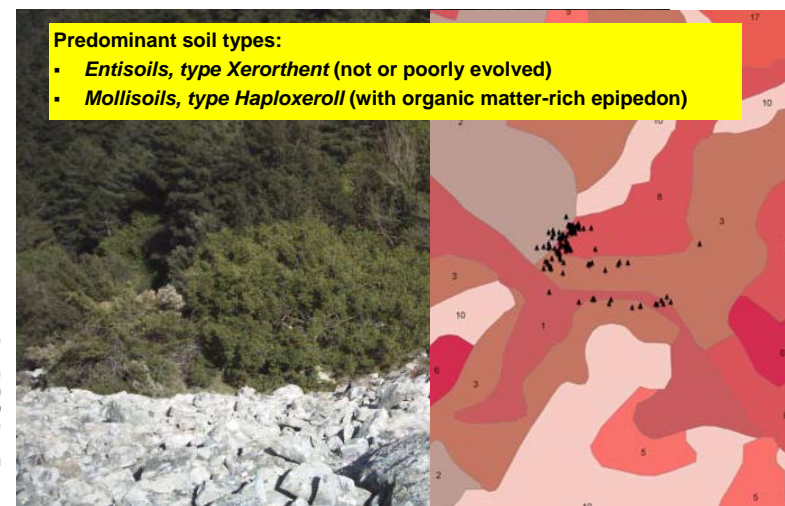
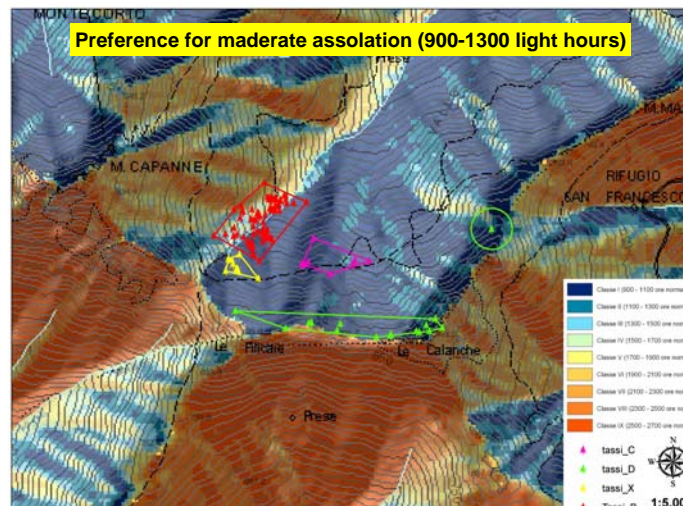
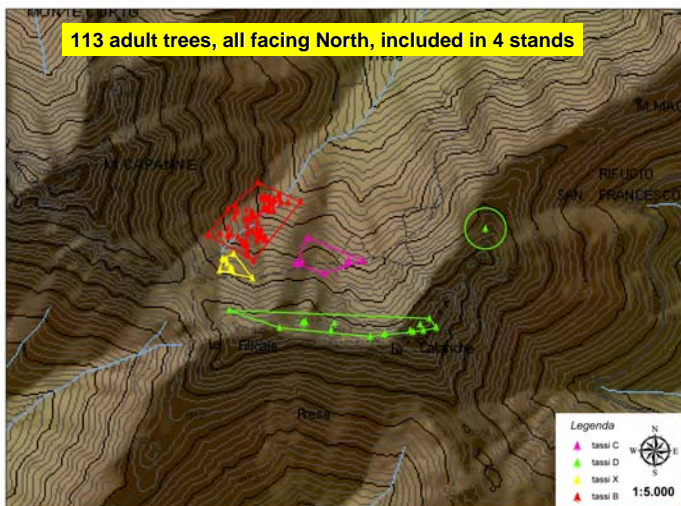
**Abstract** The aim of this work is to provide a first characterization of a previously undescribed *Taxus baccata* L. population on Elba Island (Tuscan Archipelago, Tyrrhenian sea), discovered along the slopes of Mount Capanne massif (1019 m a.s.l.). After a comparison with the local historical literature that documents an ancient presence of the tree species in the island, and an overview of the biological and ecological site characteristics, a general framework of this isolated yew population is given. The description of the *T. baccata* stands encompass GPS positioning of each plant and further data processing through GIS (geomorphology, bioclimates, soil, association). The main dendrological parameters of the trees are recorded. The sex ratio was also established and a special attention was dedicated to estimate stands regeneration. The analysis showed that the population as a whole appears healthy and vital, well adapted to severe environmental conditions such as strong wind and lack of soil, although mostly growing with shrubby habitus. Also in terms of regeneration, the stand shows to be well-established, even with strong expanding opportunities, though it seems to prefer cooler exposures and small spots of light to survive. In general, the Elba island yew population presents numerous own characteristics of great biogeographical and bio-ecological interest to play as a model tree population for further investigations of great experimental relevance. After those considerations, and especially under the indication of EU Directive 92/43/CEE – habitat code 9580 “*Taxus baccata* Mediterranean woods” – a series of conservation actions useful to manage the stand examined are proposed. Due to the information collected it will also be possible to have access to Life program to promote specific conservation actions. It also appears necessary to provide greater scientific knowledge and public awareness about the delicate balance of this habitat.



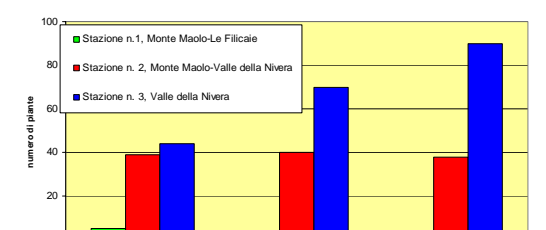
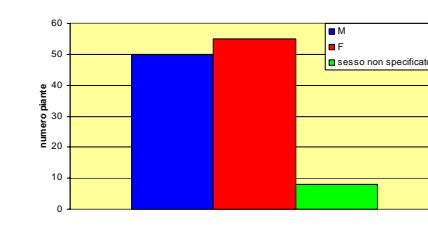
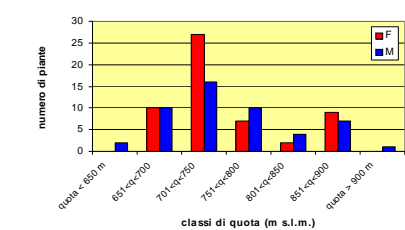
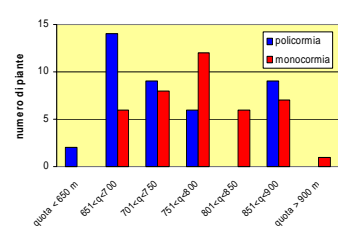
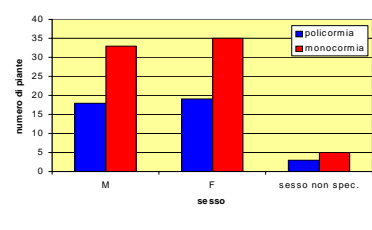
## The study site



## Site description



## Distribution and vegetative condition



Monocormy is the prevalent habitus, uniformly distributed among height classes and between sexes

Trees are concentrated between 630-900 m a.s.l. (males occupy lower and upper limits)

Uniform sex ratio: 50 males 55 females 8 undetermined

326 seedlings; size classes well distributed in 2 out of 4 stands

**Main findings and discussion** Island tree populations deserve much importance for phylogeographers, ecologists and biologists. Colonization, population dynamics, isolation are the main scientific issues, especially when dealing with a tree species of great conservational and biological relevance. Here we document *Taxus baccata* L. occurrence on Elba island with a population of previously unreported entity, structure and demography. Previous reports indicated only the presence of few scattered individuals in one of the here documented stands. Such an occurrence can be dated back at least to XVI-XVII century; although a man-mediated yew introduction during previous ages might not be disregarded, the natural endozooecy of the tree species, its ancestry and wide range cope with the good adaptation observed, speaking in favour of indigene.

Several plant endemisms and DNA lineages in Elba island, either exclusive or shared with Catalogna, Corse and Sardinia, together with the occurrence of other Tertiary relict taxa, would support the hypothesis of a long distant origin of most of the Elban flora. Nowadays, 113 adult yew trees are confined to the steep slopes (up to 58%) of Mount Capanne massif and to a close-by valley, between 650-900 m a.s.l.. The yew individuals can be included in 4 disjunct stands according to geomorphology, and in 3 managing units (for conservational purposes), according to forest typologies: (a) Mosaics of low Mediterranean maquis dominated by *Erica arborea*, *Ulex*, *Genista*, *Elychrisium*; the yew individuals vegetate in between the rocks and in pits where some soil is available. Limiting factors: strong winds, soil scarcity. Growth habitus: most of individuals are shrubs or treelets; poor/no regeneration; despite the extreme site condition, the population looks well established, as assessed by the sex ratio [max size measured: diameter 43cm, height 7.5m]; (b) supra-Mediterranean *Quercus ilex* forest / high Mediterranean maquis, dominated by *Q. ilex*, *Arbutus unedo*, *Juniperus phoenicea*, *Erica arborea*; the yew individuals are few but expanding, as exemplified by the sex ratio and high regeneration numbers; seedlings exhibit marked lightspot tracking; no visible limiting factors; [max size measured: diameter 85cm, height 13.5m]; (c) *Pinus nigra* and *P. halepensis* degraded reforested stand, with *Q. ilex*, *Fraxinus ornus*, *Sorbus domestica*, *Ostrya carpinifolia*. It is the largest yew population, well established and not-outcompeted, as exemplified by sex ratio and seedlings number [max size measured: diameter 36cm, height 13m].

The peculiarity of the Elba yew population relies on the rarity of such habitats all across the Mediterranean area (ca. 30 sites, particularly in Italy, France and Spain), to its insularization and to the peculiar demographic equilibrium despite low numbers and limiting factors. Elba is the smallest island where EU-Habitat 9580 can be found. The stands need conservation strategies aimed at habitat preservation, individual monitoring and seedling safeguard. Elban yews may indeed constitute a model of tree population for genetic analyses aimed at assessing the population origin and for genotypization aimed at paternity analyses to address colonization and demography dynamics.

### STAND 1

#### High priority actions:

- Seed collection, ex-situ conservation/multiplication
- Plant inventory, individual morphometric and sanitary data recording and monitoring
- Safeguard of the isolated individual

#### Priority actions:

- micro-terraces building to avoid further erosion and to help seedlings establishment

#### Important actions:

- Genetic analyses
- Correlating sex ratio and bio-ecological characteristics

### STAND 2

#### Important actions:

- Genetic analyses
- Correlating sex ratio and bio-ecological characteristics
- Correlating seedlings establishment and wild fauna occurrence

#### Other actions:

- Selective cuttings to open light spots.

### STAND 3

#### Important actions:

- Genetic analyses
- Correlating sex ratio to bio-ecological characteristics
- Correlating seedlings establishment and wild fauna, weed control

#### Other actions:

- Selective clearings to eliminate alloctonous pines