

Thousands of years of solitude: past, present and future of relict trees in the Mediterranean – the case of *Zelkova abelicea* from Crete

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Zelkova abelicea (Lam.) Boiss. (Ulmaceae) is an endangered tree species endemic to the mountains of the Mediterranean island of Crete (Greece). Unsustainable pastoral practices are the main threat for the species. Most *Z. abelicea* populations are heavily browsed by goats, which keep individuals in a dwarfed stunted state and strongly hinder the production of fruit and the survival of seedlings. *Zelkova abelicea* has been the subject of a conservation project since 2014. One of the project actions led to the installation of permanent fenced plots throughout the distribution range of the species with a complete exclusion of browsing.

In this thesis, I investigated the effects of browsing exclusion during several consecutive years on the growth and regeneration of *Z. abelicea* and compared the growth of individuals within the fenced plots with the growth of individuals located in control non-fenced (over)browsed areas. In the absence of browsing pressure, *Z. abelicea* individuals produce longer shoots than when browsed, therefore clearly demonstrating the negative impact of current browsing pressure on the growth of the species.

I also investigated the differences in growth that occur throughout the distribution range of *Z. abelicea* for individuals located within permanent fenced plots and characterized the plots in terms of environmental differences. *Zelkova abelicea* individuals coming from western and central Crete grow more than individuals coming from eastern Crete. Regional differences in precipitation rates as well as tree height were the variables that explained most of the variation in growth between sites.

I also studied the morphology and traits of diaspores (i.e. seed dispersal units) in fruiting *Z. abelicea* as well as its seed sterility ratio throughout the island. There is a strong between-tree-variability for most diaspore traits. However, trees from central and eastern Crete produce extremely low to null proportions of fertile seeds and oftentimes are also smaller and have shorter diaspores with less leaves and fruit.

In the last chapter of this thesis, I studied the diversity and distribution of epiphytic lichens and bryophytes living on *Z. abelicea*. The species hosts a very diverse epiphytic community and dwarfed and arborescent individuals have different communities. Diversity is higher in western and central Crete than in eastern Crete and several of the recorded species were previously undescribed for Crete or Greece.

Jury:

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