

PROJECT INFORMATION

Project title:	Interactive effects of mistletoe and drought on tree growth, defoliation and forest dieback
Project ID:	260
Contact person:	Jesus Julio Camarero Martínez // jjcamarero@ipe.csic.es

PROJECT DESCRIPTION

Forest dieback has been attributed to the interaction of several stressors including biotic factors such as mistletoes and abiotic factor such as hotter droughts. However, few data exist on how mistletoe infestation and drought affect radial growth, defoliation and forest dieback at continental scales as those encompasses by ICP Forests.

We aim to combine bioclimate models considering drought indices, radial-growth data (already available in the International Tree-Ring Data Bank) and mistletoe (*Viscum album* L.) infestation estimates to evaluate how they interact and drive dieback of pine forests across Europe.

We hypothesize that pine mistletoe can adversely affect long-term tree growth and vigour in drought-prone pine forests from Mediterranean regions in SW Europe. Few detailed data exist on how mistletoe infestation and drought affect tree growth through time and whether these two stress factors have a combined negative effect. The ICP Forests Levels I and II datasets may allow answering some of these questions since data on crown condition, growth and needle analyses were measured. We will study the basal area increment (BAI) trends to compare between trees of three different infestation degrees using linear mixed-effects models and focusing on widely distributed pine species affected by mistletoe such as Scots pine (*Pinus sylvestris*), black pine (*Pinus nigra*) and Aleppo pine (*Pinus halepensis*), among others. To identify the main climatic drivers of defoliation, growth and dieback spatial correlations will be calculated. Lastly, structural equation models will be used to quantify how structural (forest density, tree size) or growth attributes are related to mistletoe infestation, drought stress and forest dieback.