

Forest tree defoliation and mortality in Tuscany (central Italy) connected to extreme drought and heat wave in the 2017 summer: a preliminary report

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During the summer 2017, central Italy has been hit by an intense drought and heat wave, with temperatures higher than 40°C and problems for drinking water supply. In the same period, impacts on forest trees have been observed, such as early foliar shedding in deciduous broadleaved tree species and diffuse desiccation of leaves and branches in evergreen broadleaves.

The present contribution reports some preliminary observations carried out in Tuscany combining field surveys and remote sensing applications where beech (*Fagus sylvatica* L.), downy oak (*Quercus pubescens* Willd.) and holm oak (*Quercus ilex* L.) forest stands, located respectively in Apennines, hilly and Mediterranean areas, have been considered as forest ecosystems with major impacts caused by drought and heat waves. Impacts have been strongest in the sites located at the higher altitudes, south exposed and/or in poor soil conditions (especially on calcareous and serpentine soils). Distinctively, deciduous trees were affected by strong crown defoliation, but apparently did not show mortality; whereas evergreen species shown foliar desiccation and large crown dieback. Crown defoliation and mortality affected also drought-tolerant shrubs and perennials herbs.

The reduction of the photosynthetic apparatus causes the depletion of starch reserves and this may lead to growth decrease, reduced vitality of the new generation of shoots and leaves, and to an increased plant sensitivity to pathogenic attacks and environmental pressures. For these reasons, the possible consequences on forest dynamics and vegetation changes are here analysed and discussed.

Based on this, the following contribution shows: (i) a description of the type of damages observed on considered plant species; (ii) a Tuscany damage map; iii) the evaluation of the current monitoring programmes (e.g. ICP Forests) efficacy to capture and assess intense drought. Preliminary results show that possible limitations may derive from the spatial distribution of the permanent plots and the timing of the assessment.