



# Walnut and cherry trees with cereals in Greece

How to optimize maize growth under cherry trees

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Agroforestry is a traditional land use system in Voio, north-western Greece, in which farmers integrate agricultural production with high value tree species on the same area of land. This integrated approach ensures a steady economic return each year irrespective of weather conditions.

Walnut is a commonly cultivated tree species in the sub-Mediterranean and mountainous Mediterranean zones of the country. Walnut is combined with grapevines, cereals, alfalfa, vegetables or dry beans resulting in traditional silvoarable systems (Mantzanis et al. 2006). Although the trees in the experimental area were planted recently (2003), they are managed using traditional practices to produce fruits or nuts. Only recently has the potential of these trees to produce high quality timber similar, or better, to timber imported from tropical areas been recognized.



Walnut and cherry trees with winter wheat. Reference : Mantzanis, 2017



Walnut and cherry trees with maize. Reference : Mantzanis, 2005

Experimental plots were established at the Municipality of Voio, a mountainous area in north-western Greece. Two plots covering an area of 2 ha were established in collaboration with local farmers. The tree species used were hybrid walnut, cherry tree and the local species known as the European nettle tree (*Celtis australis*). One of these plots was cultivated with cereals and the other with a rotation of maize and cereals. The distance between tree rows was 15 m and in the same row the tree distance was 5 m. The tree row width was fixed at 1.5 m. Measurements of height and diameter at breast height, were taken every March, before the onset of new tree growth.



13 year-old walnut and cherry trees in autumn period. Mantzanis, 2016

## Advantages

Walnut and cherry trees incorporated with local tree species such as *Celtis australis* intercropped with cereals or legumes constitute a modern agroforestry practice appropriate for northern Greece. They are valuable biological and economic systems as they fit very well to the local soil and climatic conditions and offer various goods (timber, fruits and nuts) and services (improvement of the landscape, erosion control, absorption of water and nutrients, shade, carbon sequestration).



Tree presence improves the landscape of the area.  
Reference : Mantzanas, 2015

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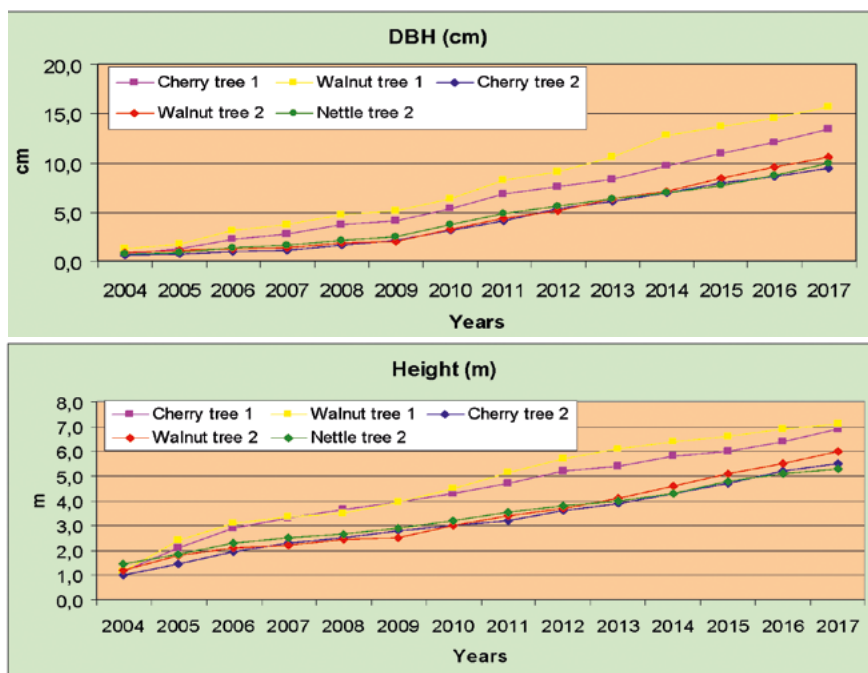
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Diameter at the breast height (cm) and tree height (m) in the two plots (1 with crop rotation and 2 with winter wheat) for the 13 years of the experiment. Reference : Mantzanas,

### Tree yield

Trees in the first plot (crop rotation starting with maize) showed strong growth during the first two years due to summer irrigation. After that period the farmer changed the crop and cultivated legumes without irrigation, resulting in a constant growth rate for a period of 4 years. During the last 7 years, continued increase in height and diameter at breast height was observed.

### Crop yield

The trees had minimal effect on crop yield in either plot, due to their relatively young age (14 years old). Studies in the same area of hybrid poplars with an age of 15 years, have shown that there was no difference in the crop yield of cereals (durum wheat) at various distances from the trees (Mantzanas et al. 2005).

### Labour and marketing

Cultivation is similar to that required for other monocrop cereal plots. Farmers are accustomed to cultivating between the tree rows and take care to avoid damage to branches and the rooting system. The marketing of the timber wood should be researched before the establishment of trees. The value of the timber is directly related with the size. Trees with more than 3 m clear stem and greater than 0.6 m in diameter are suitable for furniture industry.

## Further information

Mantzanas K, Tsatsiadis E, Batianis E (2005) Traditional silvoarable systems in Greece: The case of Askio Municipality. In: Mantzanas K, Papanastasis VP (eds.) Silvoarable systems in Greece: Technical and policy considerations. Laboratory of Rangeland Ecology, Aristotle University, Thessaloniki, Greece, February 2005 (in Greek with English summary)

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Papanastasis VP, Mantzanas K, Dini-Papanastasi O, Ispikoudis I (2009). Traditional agroforestry systems and their evolution in Greece. In: Agroforestry in Europe: Current Status and Future Prospects 89-109. Rigueiro-Rodríguez A et al. (Eds.). Springer Science.h