



ITHub 5 – Agroforestry Systems

FOREST4EU partner: USC

OG: Operational group for the valorization of the  
Extremadura chestnut tree (CASTANEA)

OG's country: Spain

Type of Innovation: Service



## Manual of recommendations for an efficient use of water in chestnut groves

### Introduction

The chestnut tree is sensitive to water deficit in the summer period. In Extremadura (Southwest of Spain), the new chestnut plantations, some of them with an agroforestry use, are established with patterns and varieties that are demanding in water. Therefore, in this region of Spain and in taking into account the current scenario of climate change, it is necessary to irrigate the chestnut trees since the water available during the summer is usually limited and irregular. Moreover, it is important to highlight that an efficient use of irrigation water in the chestnut groves must be taken into account: the water needs of the chestnut trees and what are the moments in which it is important to guarantee that the tree has all the water it needs.

### Objectives

One of the objectives of the CASTANEA operational group was the implementation of techniques to mitigate water stress in chestnut groves associated with climate change.

### Main results

The results show that if there is not enough water to cover all the needs of the chestnut grove, good water status of the tree must be maintained in the periods in which drought can reduce the production and/or calibre of the chestnuts in the current or subsequent production campaigns. Moreover, localized irrigation systems seem to be the most suitable systems for irrigating chestnut groves, as they provide irrigation water where the tree can use it. Both drip irrigation and micro-sprinklers are suitable for chestnut groves irrigation, however, micro-sprinklers imply a higher need for water than drip irrigation since in the case of micro-sprinklers, water losses due to evaporation must be compensated. On the contrary, in shallow soils, micro-sprinklers may be a suitable option. Finally, it is important to know the water status of the tree to know if the irrigation is adequate. A method to know the water status of the tree could be visual appreciation since a stressed tree presents a series of visible symptoms (slowing of the growth of shoots and young leaves, change in the angle of the leaves, yellowing, premature fall of mature leaves...). However, the problem of visual appreciation is that this method is subjective and requires a lot of experience and it is very difficult to assess the level of stress that trees endure. An alternative to know the water status of the tree could be to measure the water potential of the trunk during

the solar noon through a pressure chamber. This method is easy to use, and a numerical value is obtained that can be interpreted using reference values.



Figure 1: Pressure chamber for measuring the water potential of the trunk (on left) and drip irrigation (on right).

## Lessons learnt



1. Subsoil the soil before planting chestnut trees, to improve the water retention capacity of soil, facilitate drainage, increase porosity and permeability, and facilitate the development of the root system
2. Carry out a good design and execution of the irrigation installation
3. Use a spot or drip irrigation system
4. Use a programmer and volumetric water meter to make good irrigation programming
5. Take care of the cleaning and maintenance of the irrigation system, and periodically check that everything is working correctly
6. Choose an appropriate irrigation equipment based on the soil type
7. Place the drippers in the projection of the tree crown, where the absorbing roots are located
8. Adjust the number of drippers according to the growth of the tree
9. Water new plantings to avoid stress
10. Avoid applying excess water on chestnut trees
11. Maintain a good water status of the tree in the last period of fruit growth until the end of the harvest
12. If water is available, apply prolonged irrigation to recharge the profile at the beginning of the growing cycle when the spring has been dry and also when the rapid growth of chestnuts begins"

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

### Further information

<http://gocastanea.eu/>



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