

WALNUT TREES (*JUGLANS REGIA*) IN AGROFORESTRY SYSTEMS



What do I need to know to produce walnuts or walnut timber in Belgium?

THE WHAT AND WHY

Why walnut trees?

Walnut trees (*Juglans regia*) are being cultivated in large parts of Europe. They are known to be trees with a high market potential. Their nutritious nuts and good quality timber are highly valued and the market demand is correspondingly high. Southern European and EU Mediterranean countries are leaders in the European market, while the US and China are the most important global players. Commercial walnut cultivation is still rare in Flanders and almost all nuts are imported. This opens

up a lot of opportunities for regionally produced walnuts. Ever since the Flemish government started subsidising agroforestry in 2011, there is a growing interest in implementing walnut trees in agroforestry systems. These robust trees fit perfectly within the framework of agroforestry, not least because of the relatively low competition for light with other crops due to their open crown, late leaf appearance and early leaf fall. Walnut leaves are also rich in nutrients and decompose quickly, speeding nutrient cycling.



Young alley cropping system of walnut trees with cultivation of *Buxus* spp. in between rows (Flanders, Belgium)
Inagro

Female flowers, young fruits ; male catkins spreading pollen
Inagro

HOW IS THE CHALLENGE ADDRESSED

The right tree in the right place

Planting walnut trees for timber is a long term investment (50 years and more), but nut production can start from just 7 years after planting if conditions are favorable and the trees are well managed. *Juglans regia* prefers sunny conditions and well-drained, deep (60 – 80 cm) soils rich in organic matter. They are relatively fast-growing reaching a total height of 18 – 30 m and a canopy width of 12 – 18 m. Roots are sensitive to oxygen depletion which can occur in wet conditions. Optimal pH is 6 or more, however they still grow well on pH 5 – 6. Spring frosts can damage flowers and shoots, making late flowering

varieties more suitable in frost prone areas. Walnut trees are monoecious with male (numerous hanging catkins, April/May) and female flowers (tiny and at the end of the branches, usually appearing later) maturing at different times, limiting self-pollination. Planting a combination of varieties will improve the wind-driven pollination and hence increase productivity. However, variety choice will depend on the purpose of the trees, i.e. either high value timber production (where usually improved varieties based on selective breeding are used) or fruit production.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727872.

Keywords: silvoarable; silvopastoral; productivity; biodiversity; tree management; varieties.

eurafagroforestry.eu/afinet



HIGHLIGHTS

- Walnut trees for nut and timber production are highly valued with a high market demand
- Crown characteristics and leaf appearance and falling period makes them very compatible to crop production in agroforestry systems
- Leaves are good litter, speeding up nutrient cycling
- Problems with diseases (walnut blight and leaf blotch) are easily avoided by smart choice of varieties



Varieties of *Juglans regia* are numerous and come in all sorts of shapes and colours
Inagro

FURTHER INFORMATION

Crawford, M. 2016. How to grow your own nuts. Choosing, cultivating and harvesting nuts in your garden. Green Books, Cambridge, UK, 320p.

Oosterbaan, A. 2015. Walnoot+. Een boom voor iedereen. BoekenGilde, Netherlands, 88p.

More information (in Dutch) on the usage of walnut trees in agroforestry systems can be found on <https://www.agroforestryvlaanderen.be/NL/Kennisloket/Boomspecificatieinfo/tabid/9776/language/nl-BE/Default.aspx>

Within the European AGFORWARD project innovation leaflets have been written on the usage of walnut trees in agroforestry systems (16. Grazing sheep under walnut trees ; 33. Walnut and cherry trees with cereals in Greece). These can be found on <https://www.agforward.eu/index.php/en/Innovation-leaflets.html>

WILLEM VAN COLEN

leperseweg 87, 8800 Roeselare
willem.vancolen@inagro.be

Content editor: Maria Rosa Mosquera-Losada (USC)
FEBRUARY 2019

This leaflet is produced as part of the AFINET project. Whilst the author has worked on the best information available, neither the author nor the EU shall in any event be liable for any loss, damage or injury incurred directly or indirectly in relation to the report.

ADVANTAGES AND DISADVANTAGES

Getting the most out of your agroforestry system

Nuts or timber? That's the question you need to answer first. This decision will determine all your choices onwards.

Planting

The advised tree spacing in agroforestry systems varies from 10 to 20 m, depending on the purpose of the trees and combined cultivation, usually grassland or arable crops in Flanders. In a silvoarable system the lower density is preferred and the combination with winter cereals is considered suitable due to its early cropping. Planting is carried out between late November and early March. In humid conditions a pollinating tree should be no further than 50 m away when you want maximal walnut production. Adding organic manure and/or mulch to the area under the canopy can help establishment and growth.

Varieties

Juglans regia is the best species choice for walnut production in Flanders. There are many varieties to choose from, each with their own specific set of characteristics. Considering the humid climate in Flanders, resistance to disease is a priority. Also late leaf appearance varieties are preferred in temperate agroforestry systems. Broadview and Buccaneer are examples of two commonly used self-fertile varieties, but there are many others to explore. *Juglans nigra* x *J. regia* hybrids are preferred for high quality timber production.

Pruning

The best pruning period, avoiding sap bleeding, is from June to late-November (usually following crop harvest). For nut production, pruning aims to increase incidental light on branches, for timber it focuses on creating a branch-free stem to reduce the knots in the timber. Removing lower branches also facilitates harvesting and cultivation in silvoarable practices.

Harvesting/yield

Time of nut ripening varies from mid-October to late-November depending on the variety. Production starts on average after 7 years, reaching a peak between 30 - 50 years of around 18 kg dry nuts per tree (5 and 10 kg for 10 and 20 year old trees respectively). Collect nuts directly after falling. They can be eaten fresh, dried and preserved or processed into other products like oil. Timber production takes at least 50 years and each tree yields on average 1 m³ of timber at that stage. Prices vary from 250 to 500 euro/m³.

Diseases and pests

- Leaf blotch (*Gnomonia leptostyla*): fungus causing brown blotches on leaves and young fruit in wet conditions, causing defoliation and blackening of the nuts in extreme cases.
- Walnut blight (*Xanthomonas juglandis*): damages leaves, flowers, buds and shoots in wet conditions. Up to 80% of the crop may be lost in severe attacks. The bacterium overwinters in healthy dormant buds and catkins and can readily infect young shoots through wounds.

There are no pest species that significantly influence yields, except maybe for the codling moth (*Laspeyresia pomonella*).