



POPLARS IN AGROFORESTRY: SUSTAINABLE TIMBER PRODUCTION AND CLIMATE GAINS



1. *Populus × canadensis* 'Koster' production outside forests (right) 2. *Populus × canadensis* 'Koster' along a maize field 3. Harvested high-stem poplar

WHAT AND WHY

Poplars have long been a characteristic tree species in the Belgian and Flemish landscape. With their slender silhouettes and rapid growth, they not only shape the rural scenery but also play a key role in timber production. Thanks to their fast growth rate and high wood yield, poplars offer considerable opportunities especially now that demand for high quality poplar wood, for example for plywood and other construction applications, continues to rise. Among the native species are the black poplar and the trembling poplar. Over the years, numerous varieties, cultivars and hybrids have been developed, enabling economically viable cultivation under a wide range of conditions. Expanding poplar plantings across Europe, including through trees outside forests such as in agroforestry systems, can support the transition to a more sustainable and climate neutral biobased economy.

Keywords: Poplar, Trees outside forests, Timber production, Plywood, Circular economy, Climate-neutral economy, Biofilters, Carbon sequestration

HOW THE CHALLENGE IS ADDRESSED

Since the 18th century, poplar hybrids have been cultivated in Europe, making poplars one of the most important domesticated tree species. Both native species, such as black poplar and trembling poplar, and cultivated poplars are suitable for traditional agroforestry systems with tree rows or high-stem orchards, as well as for innovative systems like alley cropping. Planting native species is best done in groups followed by thinning, whereas cultivated poplars are planted directly in final positions in rows with 10-meter spacing. Mixed plantings with species such as oak, wild cherry, or walnut provide an interesting alternative to homogeneous cultivated poplar stands. Pruning management is important to ensure high-quality timber production.

Watch videos and access extra material at:

af4eu.eu



Funded by
the European Union

ADVANTAGES

Poplars offer numerous advantages in agroforestry systems and can play a key role in the transition to a sustainable, climate-neutral economy. Due to the limited availability of poplar wood within the EU compared to demand, agroforestry presents an attractive opportunity to expand poplar cultivation on farmland without compromising food production.

Individual trees in agroforestry generally grow faster than those in traditional poplar plantations. Trees along field edges or plantation borders benefit from more light and space, similar to solitary trees, yet still produce wood of usable quality. This makes agroforestry suitable for both timber production and landscape integration.

In Europe, wood from solitary poplars is already successfully used in the plywood industry alongside plantation wood, confirming that poplars grown in agroforestry systems are equally valuable. The final use depends largely on stem quality: straight stems are suitable for veneer and furniture wood, while lower-quality wood can be used for fruit crates, pallets, or biomass. Pruning management is essential to achieve the desired form and quality.

Additionally, poplars provide valuable ecosystem services. They act as biofilters in buffer strips along waterways and can absorb significantly more nitrogen and phosphorus than traditional riparian vegetation. Their easily decomposable leaves contribute to humus formation and soil health, while their rapid growth ensures an early, renewable timber yield. Hybrid poplars are especially effective at carbon sequestration and fit seamlessly into circular farming systems.

By integrating poplars in rows along fields, meadows, or boundaries, farmers can contribute to sustainable production and climate benefits. Future breeding and selection of new hybrids should focus on multifunctional use to enhance timber production, biodiversity, and climate impact simultaneously.

HIGHLIGHTS:

- **Poplars grow fast and provide valuable timber, making them an ideal additional source of income on farmland.**
- **Poplars can improve soil quality and reduce nitrate leaching.**
- **Poplars in agroforestry systems produce timber, increase biodiversity, and contribute to more climate-resilient farming.**



Populus x canadensis 'Koster' along a maize field

TOBI HALLEZ

Ghent University, Laboratory of Wood Technology (UGent-Woodlab)



**Funded by
the European Union**

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No GA 101086563. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.