



Fast-Growing Pioneer Tree Species in Agroforestry

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Fast-growing tree strips, such as poplars, enhance structural diversity in agricultural landscapes and improve the microclimate, while providing a large amount of biomass

The use of fast-growing pioneer tree species is gaining importance in Germany and Europe as a sustainable option for renewable energy and climate adaptation. These species are particularly valued for their rapid growth, adaptability, and revitalization capacity, while providing biomass and promoting both the diversification of agricultural farms and ecosystem services.

Fast-growing pioneer species can include (i) poplar (*Populus* spp.), with 10–15 Mg DM ha⁻¹ yr⁻¹), environmentally adaptable, with disease-resistant clones available, (ii) willow (*Salix* spp.) with a strong regrowth, suitable for wetter sites and a production of 8–12 Mg DM ha⁻¹ yr⁻¹, (iii) alder (*Alnus* spp.), a nitrogen-fixing genus, with *A. glutinosa* particularly suitable for wet soils and *A. cordata* for drier ones, (iv) black locust (*Robinia pseudoacacia*), a drought-tolerant, nitrogen-fixing species able to stabilize soils while generating energy-rich wood (~4,100 kWh Mg⁻¹), but subjected to some regulatory restrictions due to its potential invasiveness, (v) birch (*Betula* spp.), a highly adaptable and climate-resilient tree species. Hybrid birches yield almost twice the wild species, but still significantly less than poplar or willow. Therefore, birch is mainly suitable as a pioneer species or for special uses such as birch sap.

Fast growing tree species can be used as part of the (i) agrisilviculture typically managed as short rotation or (ii) silvopasture combining those tree species with livestock.

Fast-growing tree species can be harvested in a mechanized (harvesters and forwarders) or manual (chainsaws for smaller operations) way.

The use of fast-growing tree species favours (i) income diversification: through revenue from biomass and crops, (ii) EU support: agroforestry premiums (CAP funding) and (iii) sustainability: promotion of biodiversity, soil properties, and carbon sequestration.

Moreover, fast-growing pioneer trees in agroforestry offer a climate-friendly, renewable energy solution in line with EU climate goals. As biomass demand rises, the use of these species provides farmers with sustainable prospects for the future



Daniel Fischer*, Ahmed Manzim Ridwan* and Peter Zander*

* Leibniz Center for Agricultural Landscape Research (ZALF), working group "Agricultural Economics and Ecosystem Services"



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