



AGROFORESTRY SYSTEMS IN VITICULTURE



1. Micro-hedge planted in the heart of the vineyards at Domaine Muller-Koeblerle ©Ver de Terre Production
 2. Trees in vineyard plots at Domaine de Scamandre ©Ver de Terre Production
 3. Row of Service Trees (*Sorbus domestica*) spaced every 18 meters within the vineyard - Domaine de Jean Marc Dreyer ©Ver de Terre Production
 4. Spontaneous tree preserved at the edge of the vineyard - Domaine de Jean Marc Dreyer ©Ver de Terre Production

THE WHAT AND WHY

Vitiforestry combines two perennial plants: trees and vines, within the same plot, either at the edge or in the middle of the plot. The goals of these systems include better use of water and nutrients, enhanced biological diversity in soils, fauna, and flora, and the creation of a favorable microclimate: shading, windbreaks, humidity during heatwaves, and drainage during bad weather. Trees are therefore able to buffer temperature fluctuations caused by climate change. In addition to these ecological benefits, vitiforestry enables production diversification by harvesting tree products (lumber, energy, fruits, or nuts).

HOW THE CHALLENGE IS ADDRESSED

Trees in vineyards (hedges, isolated trees, rows, or groves) and their layout in the plot (between rows, at plot edges) are chosen based on their purpose: windbreaks, biodiversity refuge, fruit or timber production. Select native species adapted to the vineyard's climate, with light foliage. Plant between mid-December and late February after soil preparation (mulching or mechanical work). Recommended distances are at least 3 m from vines and 25-30 m between rows. Mulching (at least 1 m² per tree) and strong protection are essential. Formative pruning and monitoring over 3 years ensure viability and necessary adjustments.

Keywords: Vitiforestry, vine, agroforestry, competition, planting

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ADVANTAGES

To further develop the ecological benefits of trees :

Integrating trees in vineyard plots improves water and nutrient utilization through better infiltration and retention. It also enriches soils by adding organic matter (leaves, roots, mulched wood) and stimulating microbial life. Deep tree roots help reduce soil compaction and improve aeration.

Trees enhance biodiversity, recreate ecological corridors, and limit chemical inputs by promoting natural interactions between plants, beneficial fauna, and bio-aggressors. They also address climate challenges by creating a beneficial microclimate, regulating humidity, protecting against frost, reducing heat stress during heatwaves, and mitigating wind impacts. However, their effect depends on density, orientation, and foliage spacing. Regular pruning prevents excessive shading, preserving the light necessary for vines and avoiding yield reductions.

Interactions between trees and vines show limited water competition, as trees access deep water reserves within a 10-meter radius. However, the 2-3 adjacent vine rows may experience nitrogen competition. Practices like aerial pruning (crown reduction, pollarding) or root pruning help control tree growth and resource consumption. Although trees compete for surface water, they provide compensatory benefits, acting as "hydraulic lifts" that bring deep water to the surface, making it available to vines. Trees also release water vapor into the atmosphere and capture atmospheric moisture (dew or precipitation), creating a microclimate.

Choosing trees that align with the vine's lifecycle and adhering to appellation regulations (vine density, monoculture requirements) is essential.

HIGHLIGHTS:

- **Soil and Biodiversity Improvement:** Trees enrich vineyard soils, foster biodiversity, and reduce chemical inputs.
- **Climate Adaptation and Microclimate:** Trees create beneficial microclimates, regulate water, protect against frost, and mitigate heatwaves.
- **Management and Interaction:** Careful planning (species, pruning, soil work) minimizes competition with vines while meeting regulatory constraints.



Within-field agroforestry in a viticultural system at Domaine Muller-Koeblerle ©Ver de Terre Production

ANGELINE ALMEIDA

Ver de Terre Production



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