PRACTICE ABSTRACT NO.06

# Winter grain-legumes and cereals intercropping can be used as cover crops in vineyards to increase biodiversity and farmers' income.

## Problem

In the Mediterranean region, fields with vineyards are facing some issues regarding to soil moisture losses, soil erosion and low quantity of fertility (Novara et al., 2020). Degradation of soil quality can create serious problems in wine production as soil represents a key component of "terroir" (Monteiro and Lopes, 2007; Novara et al., 2021).

## Solution

The use of different plant species as cover crops (CC) in vineyards can positively affect the yield components, the quality of the product and the sustainable management of the agro-ecosystem. Furthermore, mixtures with cereal-legume intercropping as cover crops could positively affect the soil quality and fertility as well as crop diversification.

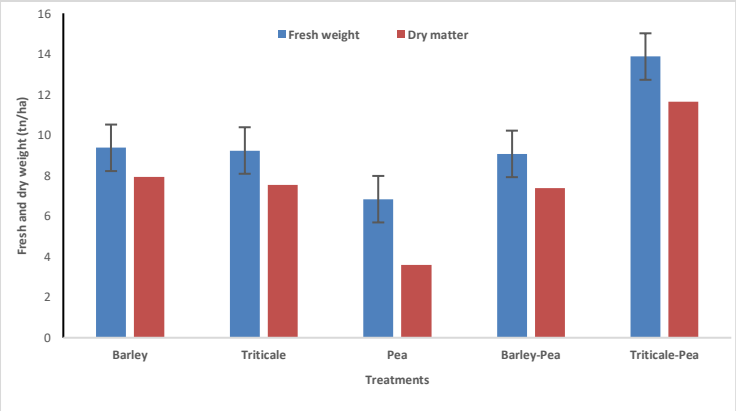


**Figure 1: Agroforestry systems of barley, triticale, pea and intercropping systems of barley-pea and triticale-pea in viticulture and fresh and dry yield.**

## Applicability box

**Geographical coverage**

Mediterranean climate

**Application period**

Autumn

**Required time**

No additional time during cultivation. The harvested crop needs to be separated at a collection point.

**Period of impact**

Duration of crop

**Equipment**

Standard machinery used for wheat cultivation

## Outcome

Choosing suitable cereal-legume species as CC in vineyards can bring several agronomic and ecosystem benefits depending on what is sought: carbon storage, erosion limitation, nitrate sequestration, weed management, biodiversity increase. However, competition risks must be managed, especially in spring.

## Practical recommendations

- The seed bed should be not too fine-grained after cultivation.
- Test soil samples and amend P and K levels if it is necessary.
- Select cultivars (cereals and grain legume) with the same maturity time according to local seed costs and availability on the market.
- Mix the seeds 75% grain legume and 25% cereal (comparing to the standard sowing quantities of the two crops) in the seed tank (check that the mixture is homogenous) and sow with a conventional seeder.
- Use same row spacing as for cereal.
- Apply weed control as needed (organic or conventional).
- Adjust height of harvester to pick up grain legumes close to ground.

## Practical testing/ Farmers' experiences

- If this crop system seems suitable for you, we recommend that you test this under your conditions.
- Separate a part of your field before sowing and apply the mixture.
- Cultivate the rest of the field as usual and compare the intercrop to the sole cereals and /or legumes.

**Figure 2: Mixture of pea and barley.**

**Figure 3: Mixture of faba bean and triticale.**

## Further Information

- **Webpage:** https://www1.montpellier.inra.fr/wp-inra/biodiversify/
- **Scientific Journal:**

Monteiro, A., & Lopes, C. M. (2007). Influence of cover crop on water use and performance of vineyard in Mediterranean Portugal. Agriculture, ecosystems & environment, 121(4), 336-342.

Novara, A., Minacapilli, M., Santoro, A., Rodrigo-Comino, J., Carrubba, A., Sarno, M., ... & Gristina, L. (2019). Real cover crops contribution to soil organic carbon sequestration in sloping vineyard. Science of the Total Environment, 652, 300-306.

Novara, A., Cerda, A., Barone, E., & Gristina, L. (2021). Cover crop management and water conservation in vineyard and olive orchards. Soil and Tillage Research, 208, 104896.

## About this practice abstract and Biodiversify

**Authors:** Paschalis Papakaloudis (AUTH), Andreas Michalitsis (AUTH), Christos Dordas (AUTH).

**Publisher:** Aristotle University of Thessaloniki, Faculty of Agriculture, Forestry and Natural Environment, School of Agriculture, University Campus, 54124, Thessaloniki, Greece, http://www.agro.auth.gr/

**Date:** March 2024.

**Biodiversify** is a PRIMA 2019 project (https://www1.montpellier.inra.fr/wp-inra/biodiversify/) investigating how agricultural biodiversification (i.e. mixed cropping, cover cropping and agroforestry) can increase ecosystem services, sustainability and resilience of Mediterranean agriculture.

The PRIMA programme is supported under Horizon 2020 the European Union's Framework Programme for Research and Innovation.