

Environmental impact of crop diversification in steep vineyards

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Introduction and study area

EU-funded project DIVER-The FARMING aims to research sustainable and economically beneficient diversified cropping systems using low-input agricultural practices decrease that are tailor-made to fit the unique characteristics of six EU pedoclimatic regions.

Germany is involved with a broadbased study in organic steep slope viticulture.



Experimental design

Investigation and assessment of:



Solution? Colonisation and management of herbs in vineyards. Selected herbs are:

- adapted to the climate region domestic
- benefiting wildlife
- erosion-minimising weed displacing





Herbs:

Dregano

Colonisation & growth / manageability / effects on vine and soil / water demand during dry conditions and growth phase / subsequent use (food, crop protection, herbal essences, seed production)

Soil erosion and contamination:

Soil fertility and pollutants / soil structure / water availability and soil carbon storage carbon sequestration by biomass / erosion rates greenhouse gas emissions / benefits, drawbacks and limitations of machinery adapted to diversified cropping systems

Effects on biological diversity:

Microbial community structure / microbial activity of the soil / soil macrofauna / vegetation und biodiversity

		A: Vine intercropped with Thymus vulgaris B: Vine intercropped with Origanum vulgare C: Vine monocrop
		Gerlach trough





Figure 1: Total Soil Erosion 2018 and one extreme event at study site (CS9) and at a long term study site (LT5).

Figure 4: Nitrous oxide fluxes.







Figure 5: Area covered by herbs in 2018 – vineyard and single stand compared (mean results).

Figure 6: Wine grape yield (kg/ha) and number of grapes per wine-plant (mean results). Average yield 2018: 7536 kg/ha.

Figure 7: Quality parameters of wine juice – acidity (g/l), pH, °Oe (mean results 2018)

Preliminary Conclusion

- Because of a high drought, tillage under the herbs in 2018 was particularly intense. Due to one extreme rainfall event, this resulted in very high erosion rates. Most of the soil erosion in 2018 is from this extreme event.
- Due to soil tillage, soil erosion increased after herb planting in rows (compared to monocrop lines).
- Due to erosion, SOC is low and the amount of coarse fragments are high under the vines. We expect a reduction of soil erosion after consolidation of herbs in 2019.
- Nitrous oxide fluxes are low, but a peak is measurable during the extreme rain event.
- As a result of heavy rainfall on June 1st and summerdrought, some damage to the herb-plantings was visible.
- Development of aromatic herbs was better in single stand compared to intercrop plantings during establishment year 2018. Variation in soils (less rock fragments), field preparation (deeper cultivation in single stand) and fewer competition (water/nutrients) can be an explanation for differences.
- Vine yield in 2018 was sufficient for site. Wine in rows with Thyme showed lower number of grapes per wine-plant and yield. Seedestablishment of Oregano failed, so this treatment is shown as "control".
- Crop quality was tested on selected wine-plants. The parameters showed similar qualities throughout treatments. Further development of herbs can cause higher differentiation throughout the next years.

DIVER FARMING

Crop diversification and low-input farming across Europe: from practitioners' engagement and ecosystems services to increased revenues and value chain organisation

Project partners:

