DIVERFARMING

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

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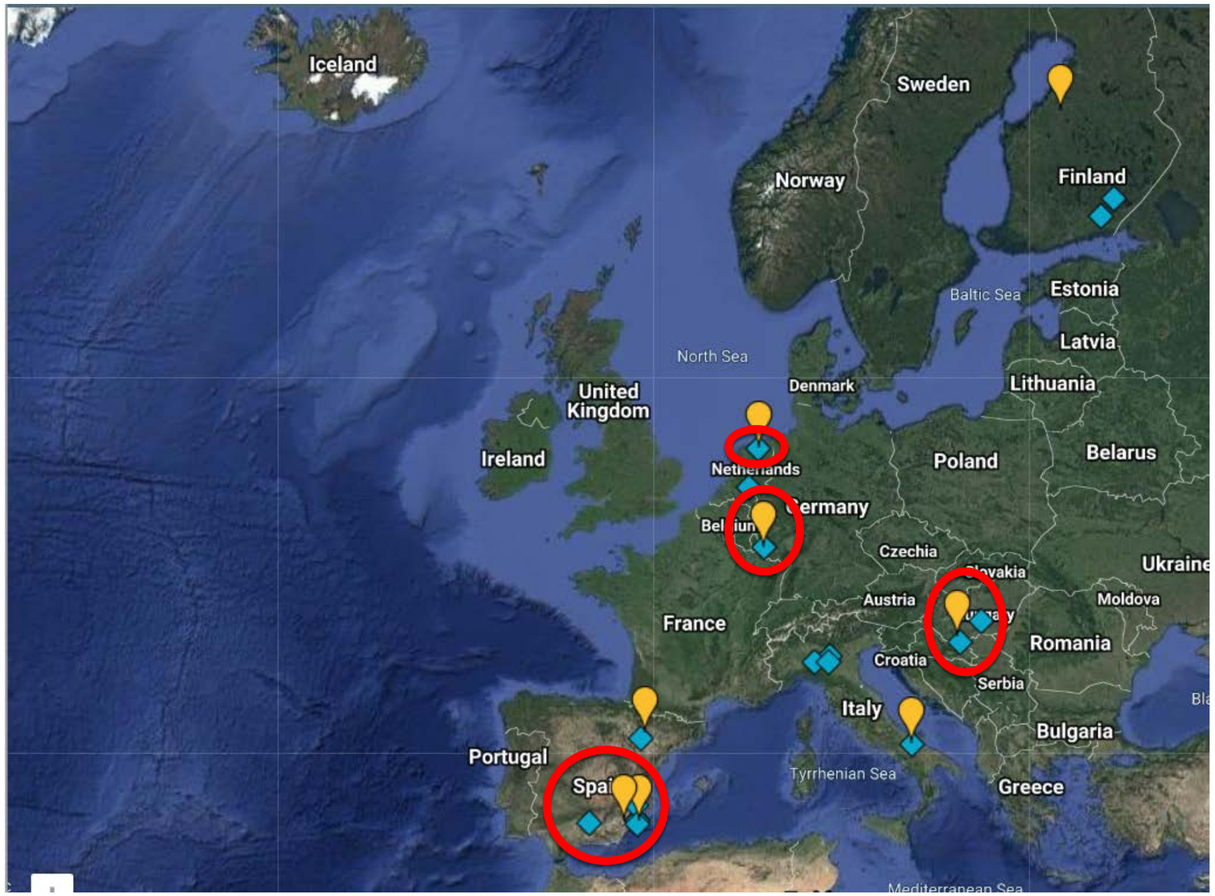
General Scope:

To increase the **long-term resilience, sustainability and economic revenues** of agriculture across the EU by assessing the real benefits and minimising the limitations, barriers and drawbacks of **diversified cropping systems under low-input practices** that are tailor-made to fit the characteristics of six EU pedoclimatic regions, and by adapting and optimising the downstream value chains organization.

Benefits of Intercropping (annual and perennial crops) to sustain yields and foster the delivery of ecosystem services

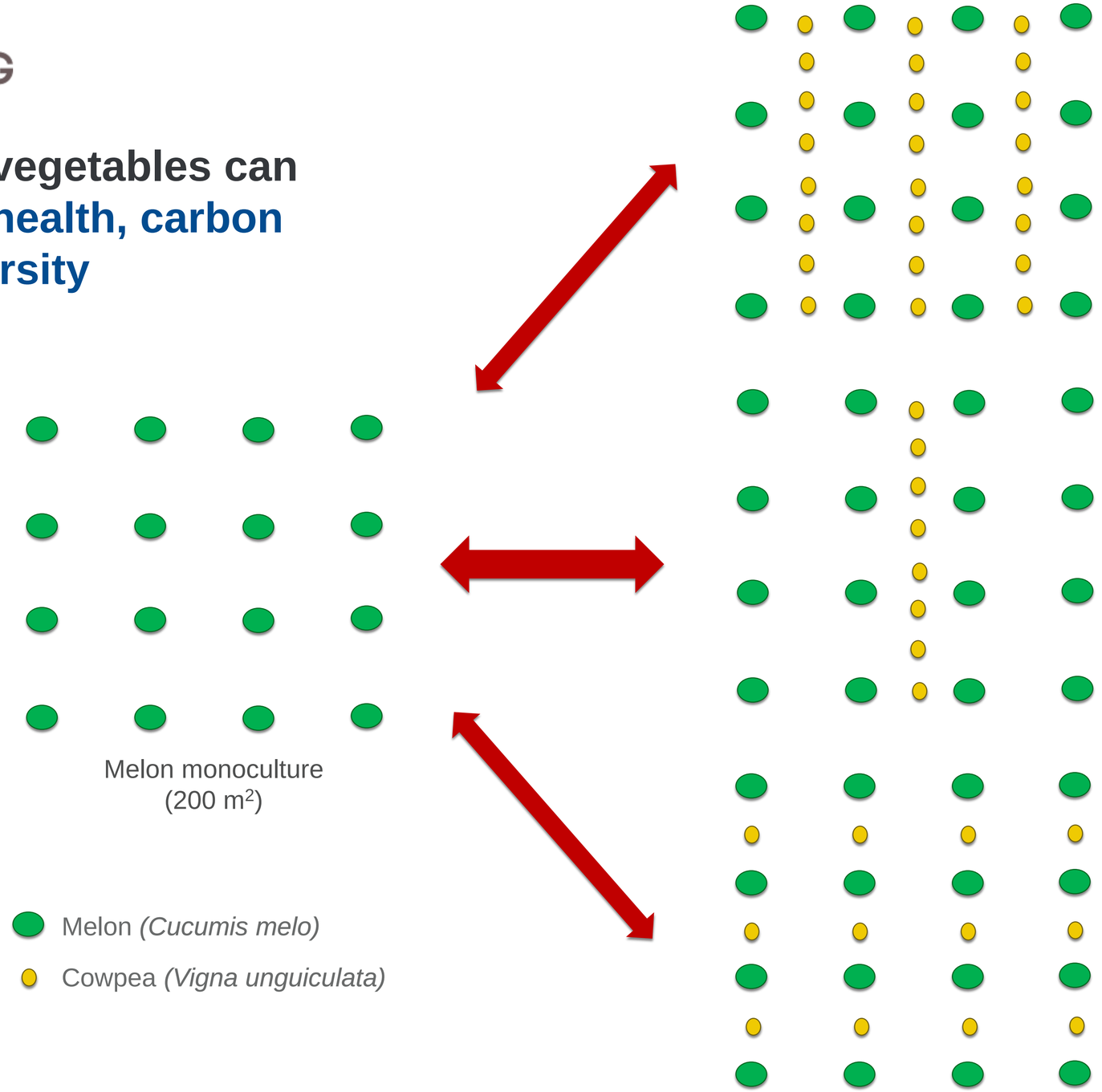


DIVERFARMING

Intercropping systems in vegetables can enhance crop yields, soil health, carbon sequestration and biodiversity

Fertigated

(Intercropping with 30% reduction)



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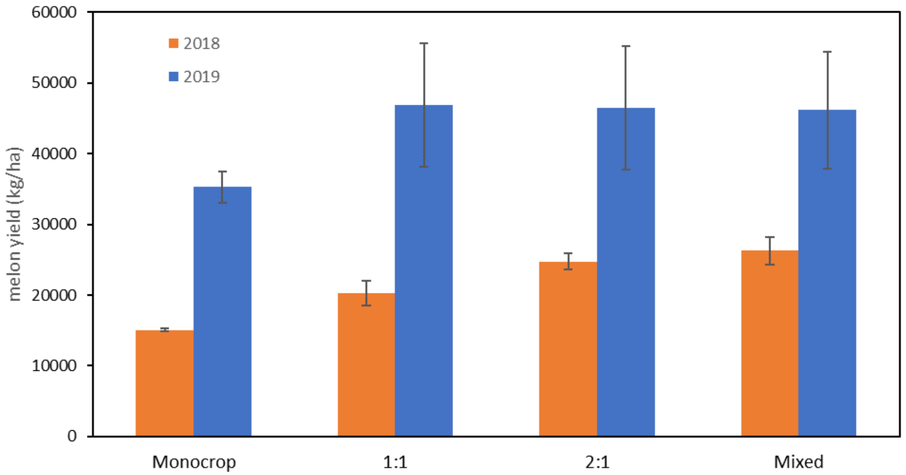
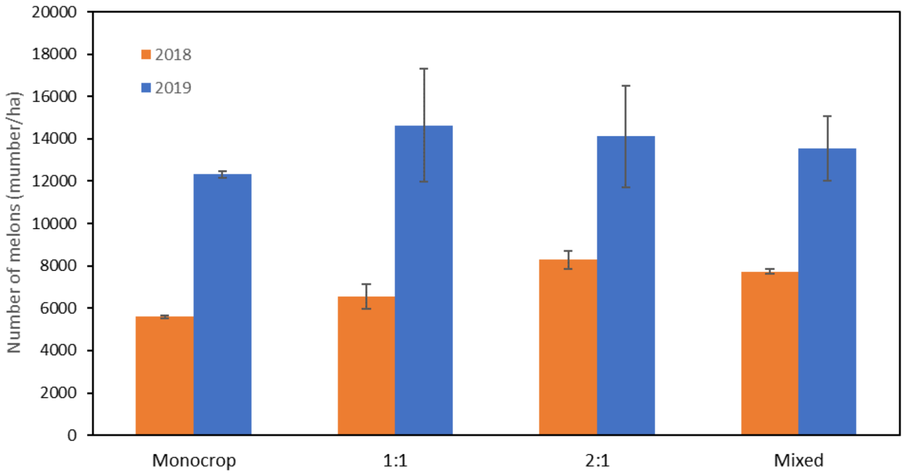
Row intercropping 2:1

Melon monoculture

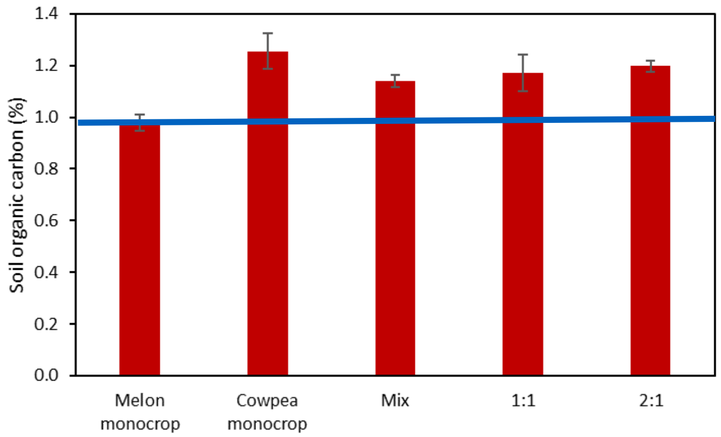
Mix intercropping

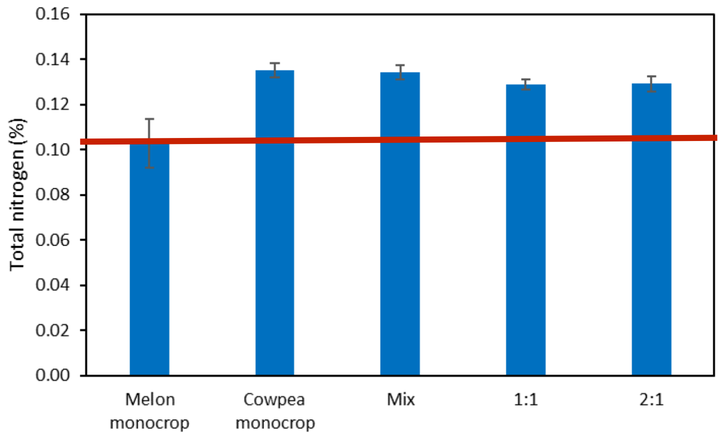
Intercropping systems in vegetables can enhance crop yields

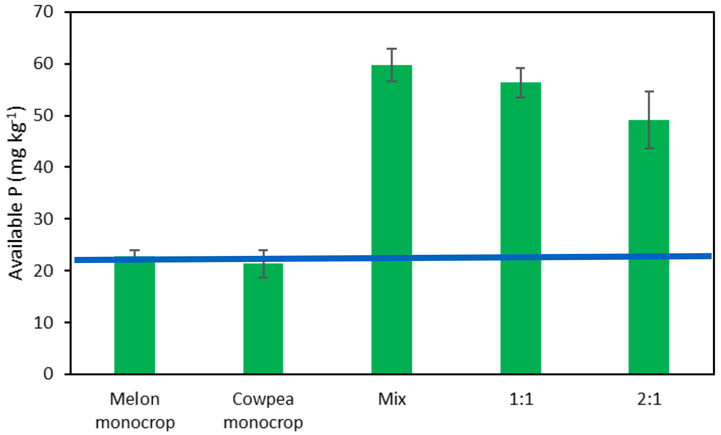


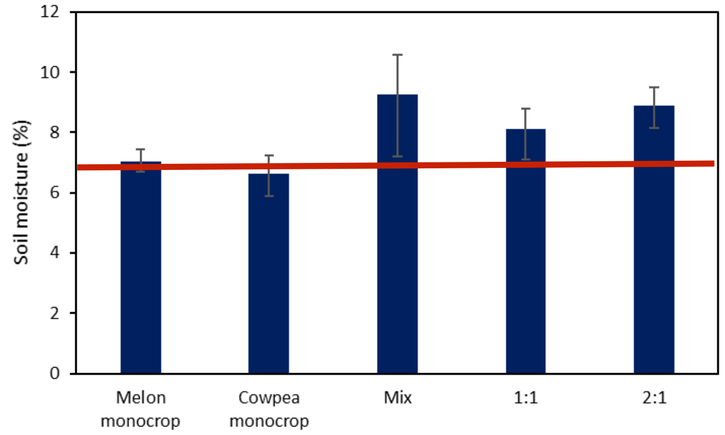


Intercropping systems in vegetables can enhance soil health









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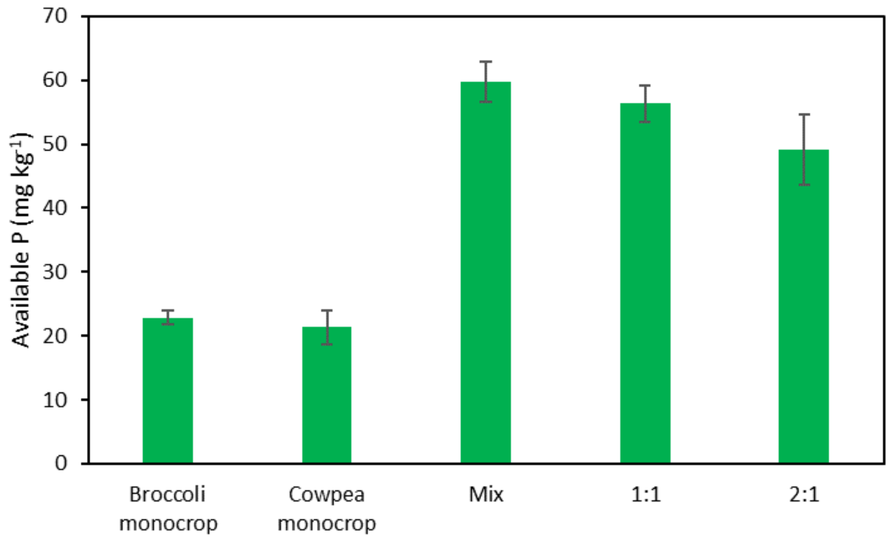
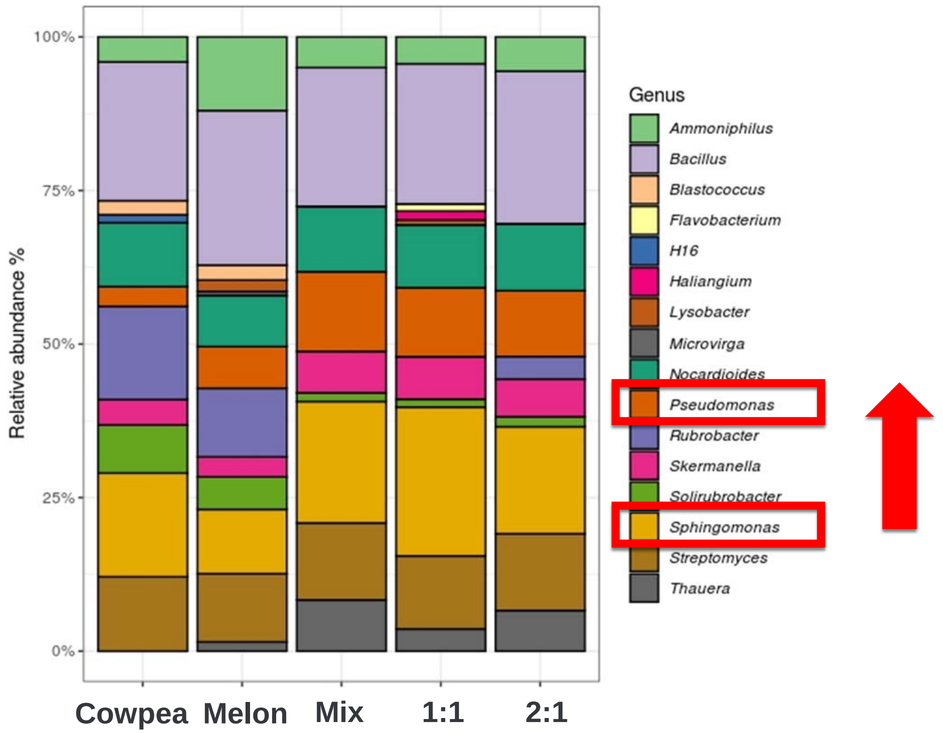
Intercropping systems in vegetables can enhance soil biodiversity



Relative abundance of bacterial genera



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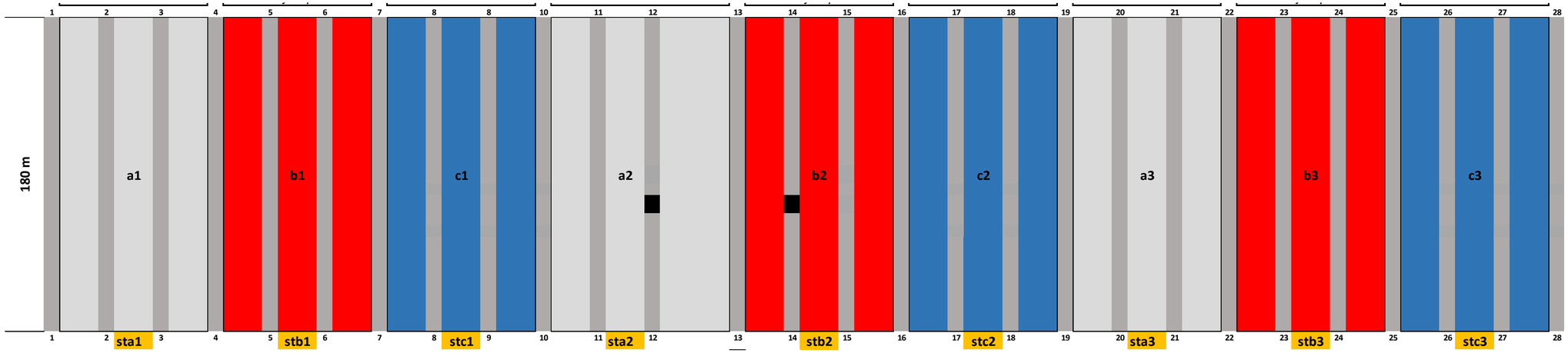
Intercropping systems in vegetables can enhance land productivity and soil health



Asparagus monoculture

Asparagus intercropped with pea

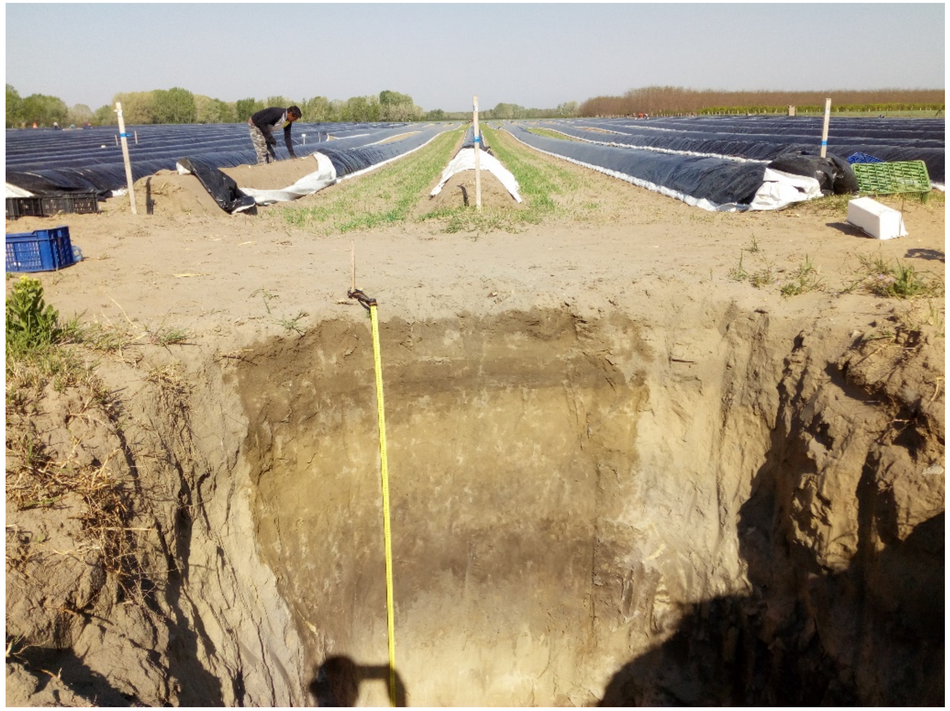
Asparagus intercropped with oat

Intercropping systems in vegetables can enhance crop yields, soil health and C sequestration

		Total N [g/kg]	Total C [g/kg]	$NH4^+$ [mg/kg]	NO^3-N [mg/kg]
Asparagus monoculture	**Avg**	0.30	9.80	4.14	1.25
	St Dev	0.11	1.90	0.67	1.12
Asparagus + field pea	**Avg**	***0.38***	***10.61***	***4.58***	***1.68***
	St Dev	0.07	1.91	0.25	0.68
Asparagus + oat	**Avg**	0.31	10.32	4.14	1.38
	St Dev	0.06	2.04	0.55	1.39

Intercropping decreased wind erosion

Arenosol (high sand content)



Alley cropping can enhance land productivity and ecosystem services in almond orchards

Almond Monocrop

Almond diversified with Thyme (*Thymus vulgaris*)

Almond diversified with Caper (*Capparis spinosa*)

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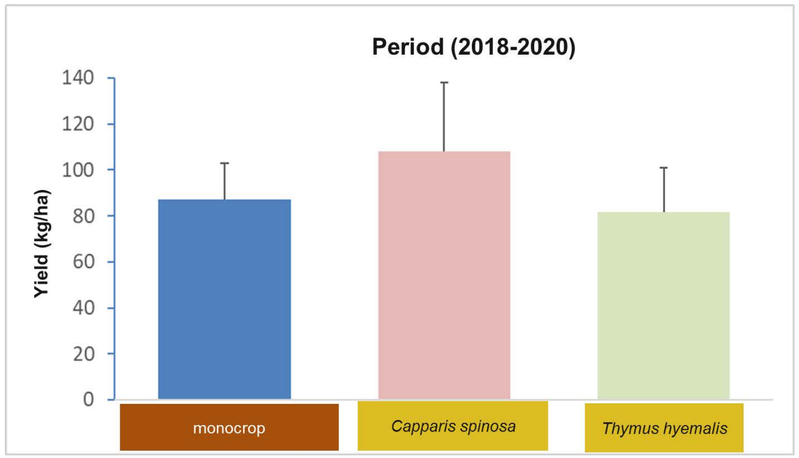
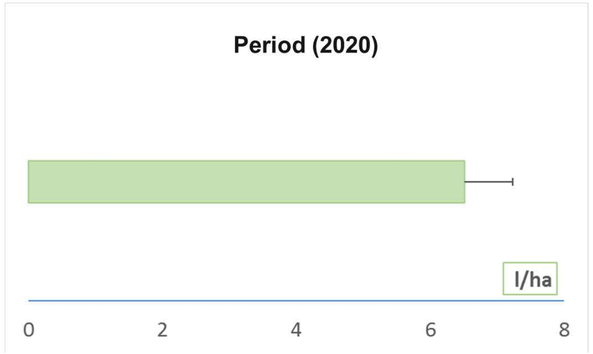
Alley cropping can enhance land productivity and ecosystem services in almond orchards

Almond yield



Diversification does not reduce the yield of the main crop

Thyme essential oil yield



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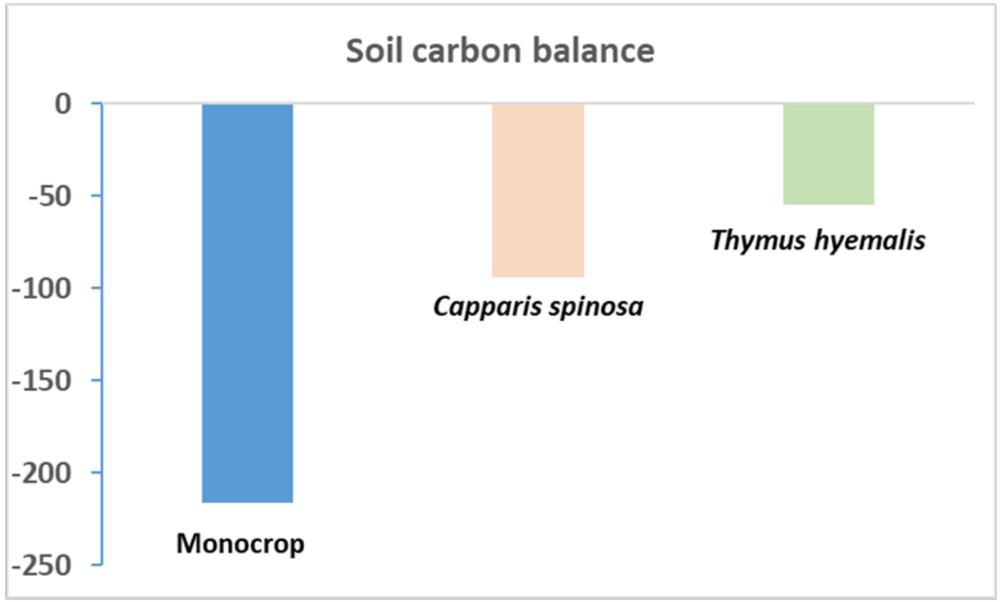
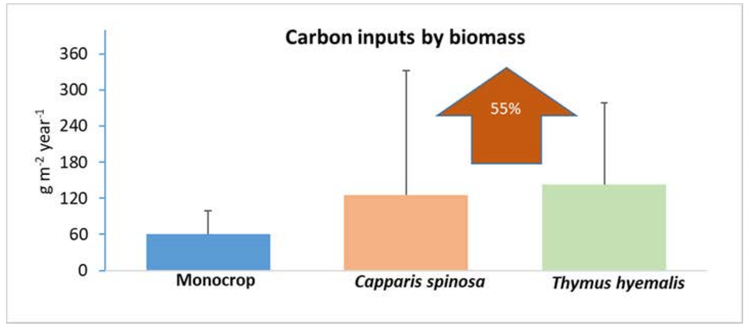
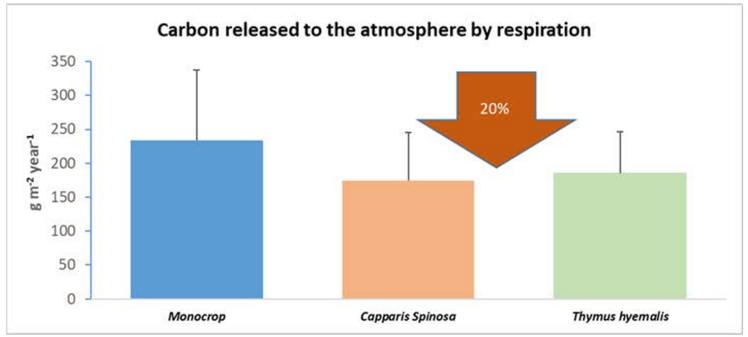


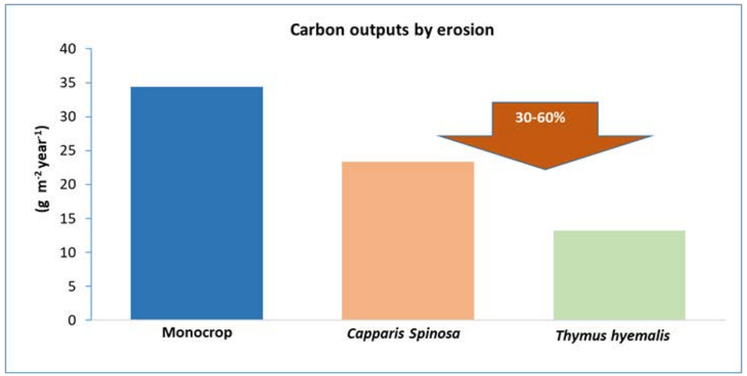
*adapted conservation mass approach proposed by Yoo et al. (2005):

$$\frac{dSOC}{dt} = NPP - Rs - \varepsilon$$

ε : carbon exported or deposited by water erosion







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Row cropping can enhance land productivity and ecosystem services in vineyards

***Vitis vinifera* L. cv. 'Riesling' intercropped with**

Origanum vulgare ***Thymus vulgaris***

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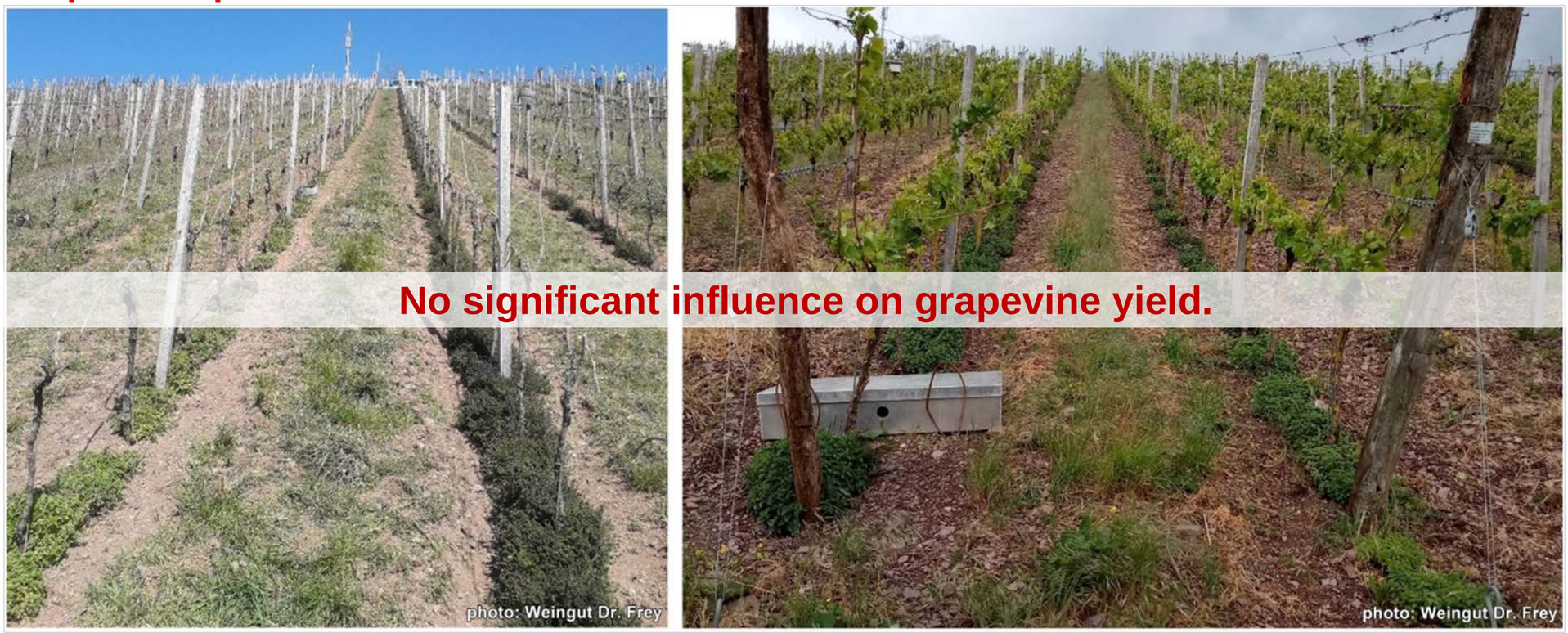
Row cropping can enhance land productivity and ecosystem services in vineyards

Crop development:



Oregano 1 year | Thyme 2 years | Oregano 2 years | Oregano 1 year

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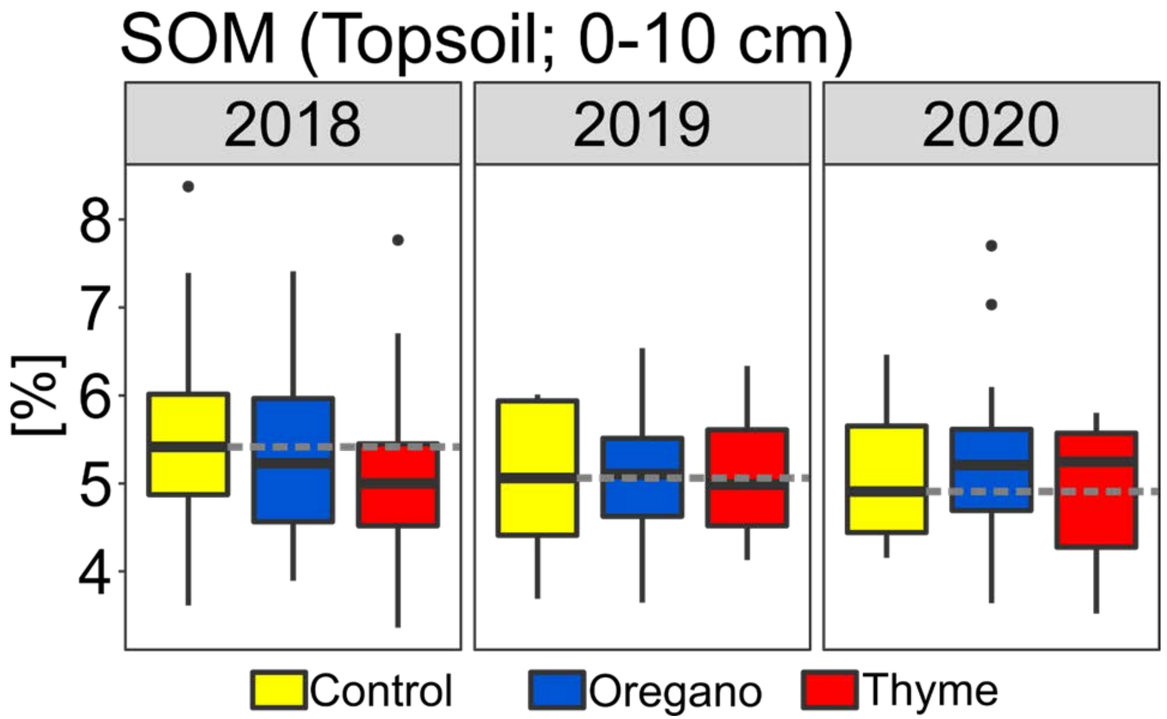

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Row cropping can enhance land productivity and ecosystem services in vineyards

- Land equivalent ratio – LER ➔ Crop diversification up to 51% more efficient.
- Low water competition between grapevines and herbs.
- Improved ground-cover and soil erosion control.
- Improved biodiversity and habitat quality, pest and disease control, aesthetical land valorization.
- Good marketing opportunities of herbs as extract for cosmetics, perfumes, dietary supplements, food and plant fortification.

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Alley cropping can enhance land productivity and economic revenues in vineyards

vineyard with grass

vineyard with yarrow (*Achillea millefolium*)

Yield in 2020: 577 kg/ha

Oil yield: 1271 mL/ha

Cosmetic industry

Oil for leaf-spraying in organic farming

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