


PromESSinG: PROMoting EcoSystem Services in Grapes

Mangement concept to promote biodiversity-linked ecosystem services in vineyards

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PromESSinG: Partner

University of Natural Resources
and Life Sciences, Vienna
Department of Crop Sciences

Promoting EcoSystem Services in Grapes

Management Concept for Central European Vineyard Ecosystems

Hochschule Geisenheim University, DE

Bordeaux Sciences Agro, FR

Universität Freibourg, CH

Universität für Bodenkultur, Wien, AT

Ovidius Universität Constanza, RO

Question and aims

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- How can biodiversity promote Ecosystem Services leading to higher added values?
- Identification of management options for pormoting biodiversity linked ESS in order to reduce external inputs in vineyard ecosystems
  - Linkage between biodiversity parameters with regulating and supporting ESS
  - Effects on provisioning ESS in vineyards
  - Providing data for sustainable production

Question and aims - scheme

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Cultural ESS
Tourism, recreation

Soil cover management
Disturbance intensity
Management strategies

Macro-, Mesofauna
Microflora
Plants
Mycorrhiza
Biodiversity

Landscape diversity

Supporting/Regulating ESS
Soil fertility
Soil stability
Pest control
Soil water retention

Providing ESS
vine vitatlity,
grape quality

Locations

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- Kamptal, Kremstal, Neusiedlersee Hügelland: 9 vineyards
- Rheinhessen, Rheingau: 9 vineyards
- Bordeaux: 9 vineyards
- Valais: 33 vineyards
- Dobrogea Region: 9 vineyards

- **Weingut Esterházy**
  Großhöflein (Zweigelt), St. Georgen (Merlot)
- **Weingut Kollwentz**
  Großhöflein: Lunzerried, Dürräcker (CS, Pinot noir)
- **Weingut Jurtschitsch**
  Langenlois: Gemeindespitz, Faiglloiser, Diernitz (GV)
- **Weinbauschule Krems & BOKU Flächen**
  Langenlois: Landersdorf (Pinot noir), Krems: Sandgrube (Riesling)

Vineyards – Experimental Setup

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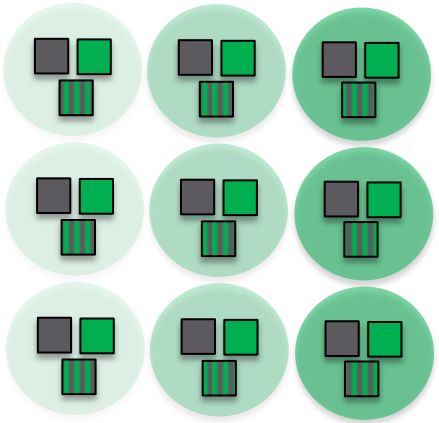
- 3 gradients in landscape structure (Radius 1 km)
  - 90, 60, 30% vineyard area
  - Increase in natural habiats around experimental vineyards
- 3 different ground cover management strategies in each experimental vineyard
  - Bare ground
  - Alternating ground cover
  - Permanent ground cover



[Ilona Leyer, 2015, Präsentation]

Vineyards – Experimental Setup

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- 4 interrows per treatment
- Biodiversity assessment in both middle interrows

Photos: Bettina Schlossnikel

Work Packages

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Thematic WP

Integrative WP	WP 2 Biodiversity	WP 3 ESS	WP 4 Provisioning Services	
	Sampling: • Macrofauna • Microflora • Mesofauna • Plants	• Soil fertility • Soil structural stability • Pest control • Water retention	• Grape quality • Yield • Socio-economic values	2016 & 2017
WP 1: Experimental Setup	• Development of techniques and methods, • Site selection, GIS mapping • Standardised sampling design			2015
WP 5: Analysis and Synthesis	• Statistical procedures • Synthesis by structural equation modelling			2017
WP 6: Spread of results	• Spread of knowledge: stakeholder groups • Scientific community: scientific papers, presentations • Policy recommendations (policy brief)			2016 & 2017

Experimental assessment

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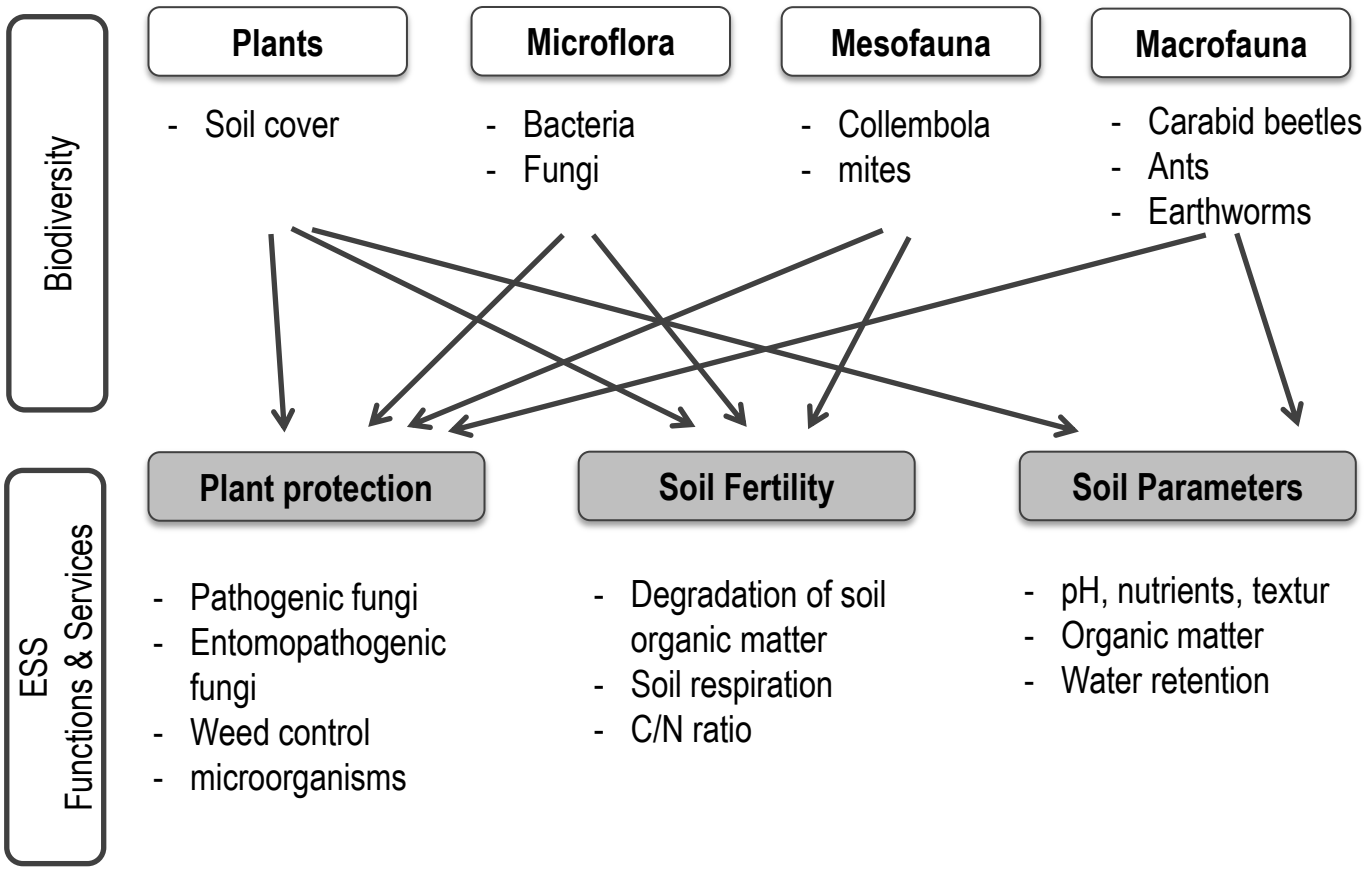

First results: Austria 2015

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- Descriptive surveys of the trial fields:
  - Soil parameters (type of soil, soil moisture, pH, ...)
  - Vegetation survey
- Implemented experiments:
  - TBI including timeline
  - Pitfall traps
  - Chlorophyllmeasurements
  - Ripening parameters
  - Pre-Test of earthworm extraction
- First preparations for socio-economic study

First results: Pitfall traps

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Field	Wine Region	Number of Carabids
1	Kamptal	215
2	Kremstal	69
3	Kremstal	201
4	Neusiedlersee Hügelland	207
5	Neusiedlersee Hügelland	516
6	Neusiedlersee Hügelland	568
7	Neusiedlersee Hügelland	88
8	Neusiedlersee Hügelland	210
9	Kamptal	1011
10	Kamptal	1209
11	Kamptal	532

Vineyards surrounded by forest

Organic Vineyards

First results: Pitfall traps

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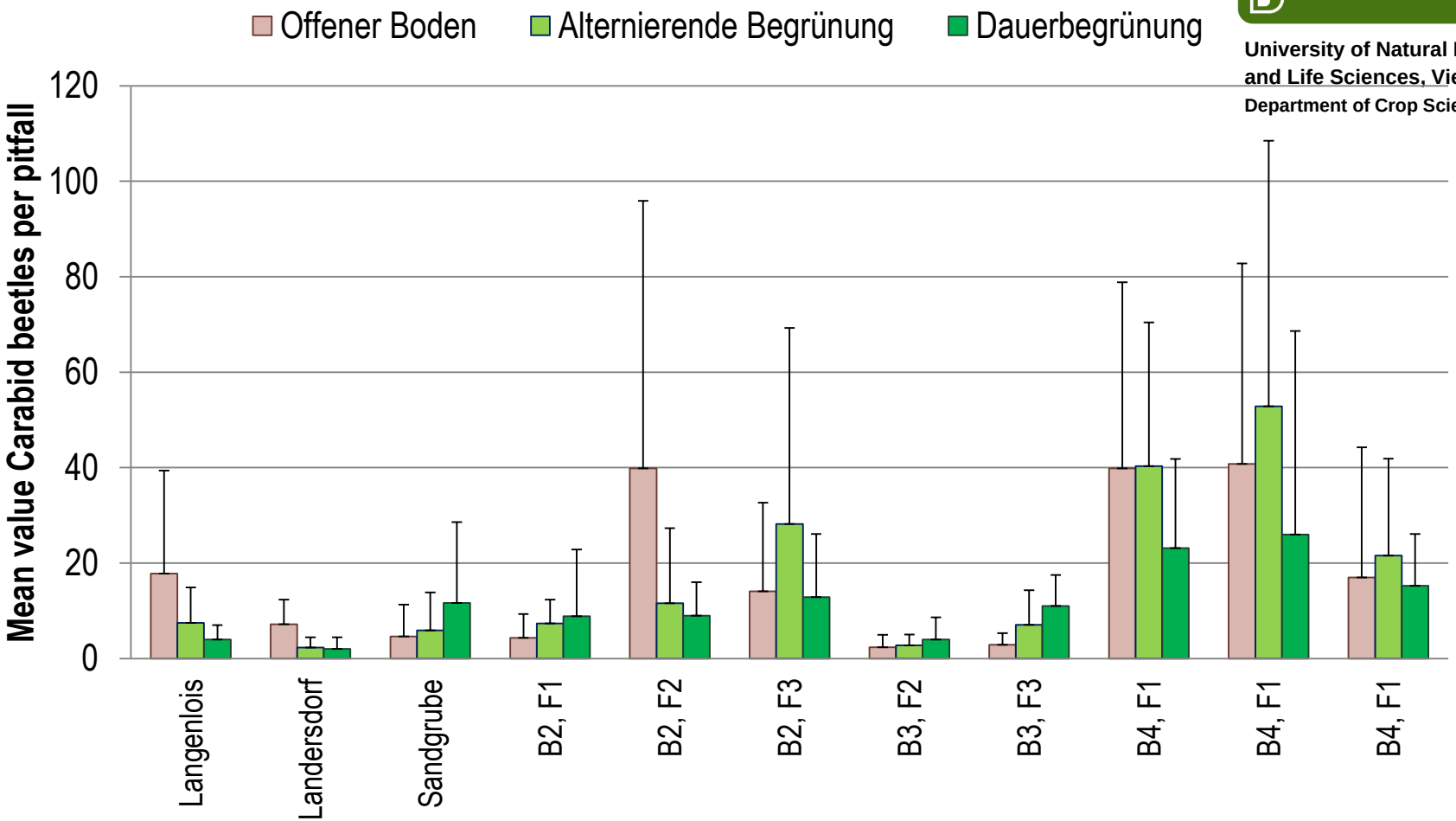

First results: decomposition

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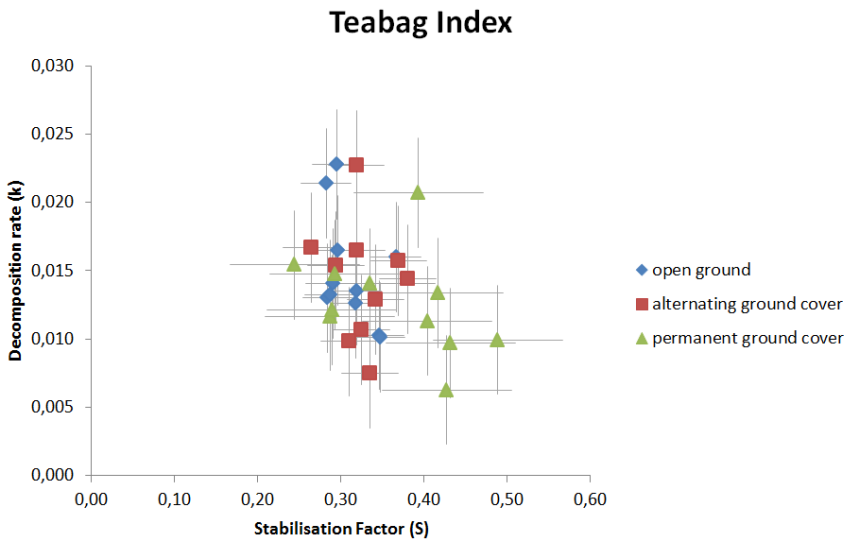
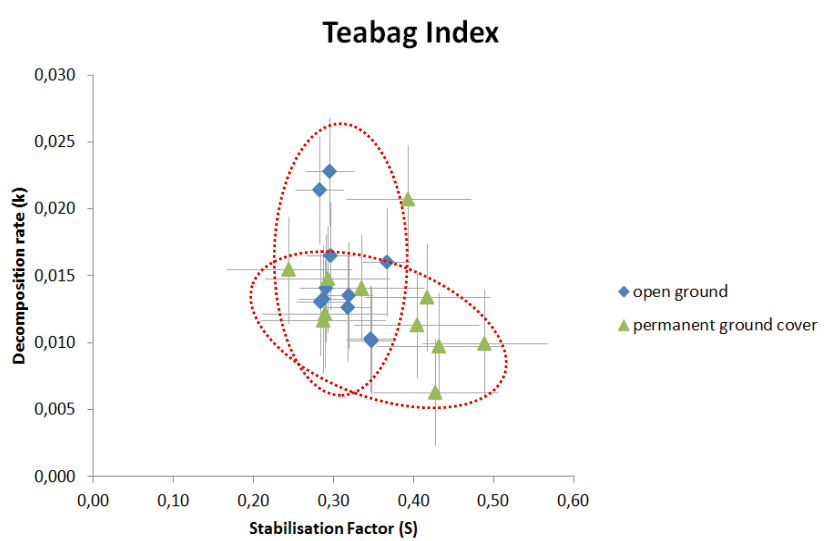
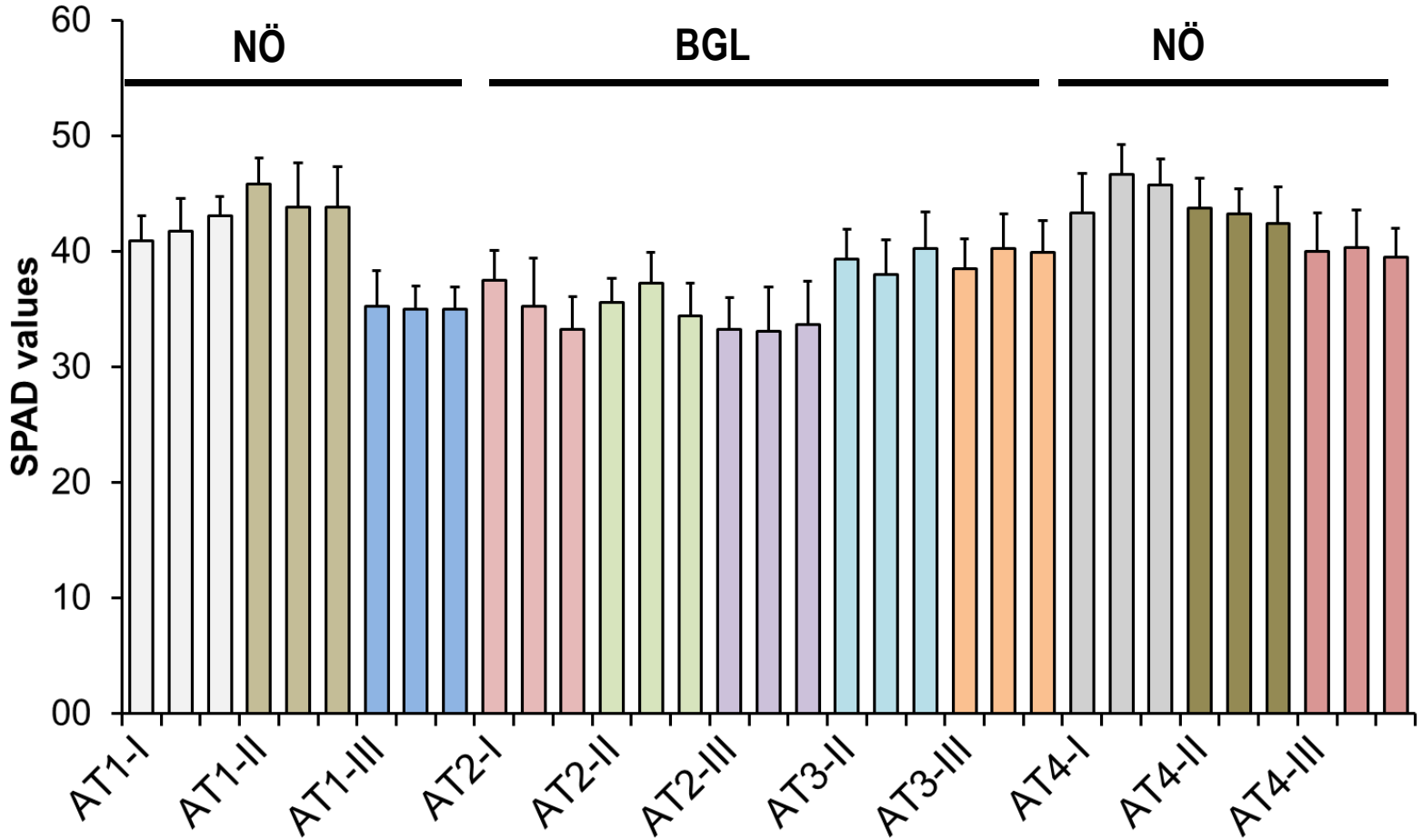
- Teabags were in the soil for 90 days (June until August)
  - ➢ Open ground with higher decompositon rate in first year





Chlorophyll content (SPAD Meter)



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Abstract

Preliminary results (2015)

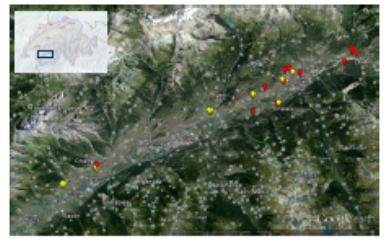
- Soil management affects microbial biomass and selectively ecosystem functions and services
- Effects on grape quality are conditional on grape variety
- Conversion to vegetated soils might need adaptation in the grape varieties cultivated

Soil management

bare soil: chemical/mechanical removal of vegetation
alternating: application of treatment every second row
green: no removal of vegetation, irregularly mown

Stakeholders involved
wine growers, wine grower associations, conservation advisors, land managers, regional & European authorities, policy makers

Location of study sites

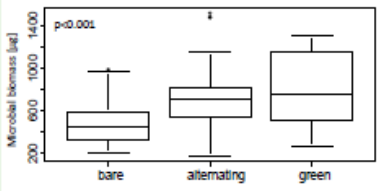


33 study sites in the Swiss Valais
2 grape varieties (Pinot noir, Fendant)
3 soil treatments (10 x green; 10 x bare; 13 x alternating)

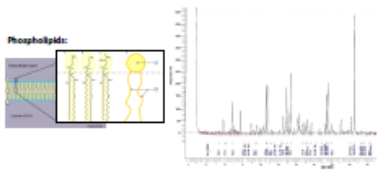
Effects of soil management on microbial community and ecosystem functions

Biodiversity of microorganisms

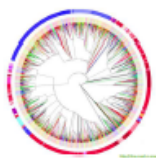
Microbial biomass



PLFAs (in progress)

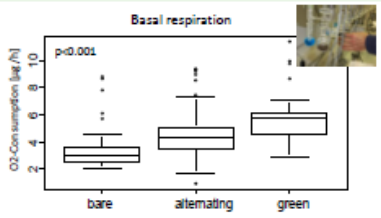


Microbial community composition of Bacteria (16S) and Fungi (ITS) (in progress)

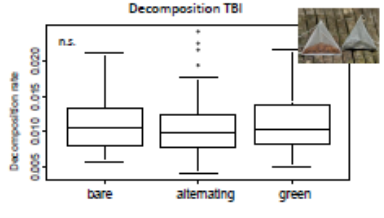


Ecosystem functions

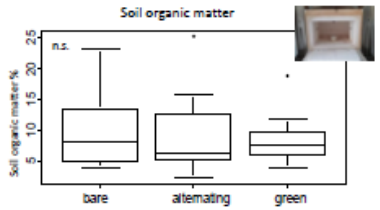
Basal respiration



Decomposition TBI

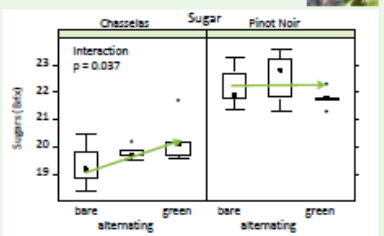


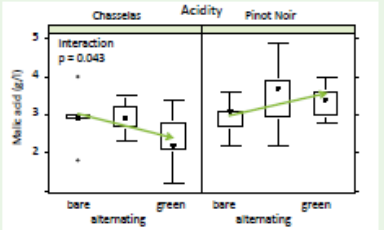
Soil organic matter

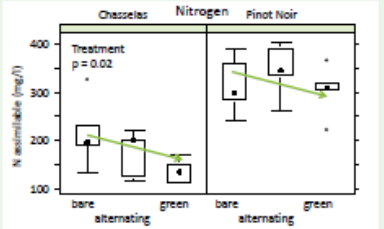


Ecosystem services

Grape quality







biodiversa

Ressource Boden
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FNS-SNF

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Thank you for your attention

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