



## Soil and climate zoning determining grapevine resource yield-gaps in Languedoc-Roussillon vineyards

Hugo Fernandez-Mena, Nicolas Guilpart, Philippe Lagacherie, Renan Le Roux, Mayeul Plaige, Maxime Dumont, Marine Gautier, Jean-Marc Touzard, Nina Graveline, Hervé Hannin, et al.

### ► To cite this version:

Hugo Fernandez-Mena, Nicolas Guilpart, Philippe Lagacherie, Renan Le Roux, Mayeul Plaige, et al.. Soil and climate zoning determining grapevine resource yield-gaps in Languedoc-Roussillon vineyards. Montpellier Vine & Wine sciences - International seminar: Sharing knowledge & designing research programs to address key challenges of the vine-wine sector, Oct 2022, Montpellier (FR), France. , pp.39-39, 2022, Seminar proceedings of Montpellier Vine & Wine sciences - International seminar: Sharing knowledge & designing research programs to address key challenges of the vine-wine sector. hal-03869137

**HAL Id: hal-03869137**

**<https://hal.inrae.fr/hal-03869137>**

Submitted on 24 Nov 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

OCTOBER 11-12-13, 2022 MONTPELLIER

# MONTPELLIER VINE & WINE SCIENCES INTERNATIONAL SEMINAR

Sharing Knowledge & Designing Research  
Programs to Address Key Challenges  
Of the Vine-Wine Sector



**MUSE**  
MONTPELLIER UNIVERSITY OF EXCELLENCE

KEY INITIATIVE  
MONTPELLIER  
VINE & WINE  
SCIENCES



**INRAE**  
la science pour la vie, l'humain, la terre

**L'INSTITUT  
agro Montpellier**



# SEMINAR PROCEEDINGS

# Table of contents

INTRODUCTION .....	5
CONFERENCES .....	6
Climate Change: adaptation and mitigation .....	7
A global overview on adaptive strategy to climate change of the wine industry .....	8
Characterization of genomic diversity in Vitis.....	9
Genetic diversity of the local criolla germplasm and adaptation strategies to a changing environment in Chile .....	10
Temperature dynamics and impact on cold hardiness, deacclimation, and budbreak phenology ..	11
Breeding of drought tolerant cultivars.....	12
Integrated grape-to-wine studies to evaluate adaptation and resilience of grapevine scion / rootstocks to water limitation.....	13
Reduction of inputs .....	14
Microbiological approaches to reduce bentonite requirements.....	15
How to cultivate grape without pesticide, the VITAE project.....	16
Developing a satellite image-based sampling protocol for leaf blade nutrient monitoring in vineyards .....	17
Tools to discover resistance phenotypes and haplotypes in diverse germplasm.....	18
Reducing inputs, adapting to climate change and supporting the agro-ecological transition of grapevine systems through biodiversity management.....	19
Building quality.....	20
Building authenticity in the wine sector: a narrative analysis of newcomers' stories.....	21
Varietal thiols: from vine to wine.....	22
Enzyme treatment enhances astringency through decreasing polysaccharide and increasing polyphenolic content in Cabernet Sauvignon wines.....	23
Interplay of water deficit and grape berry chemical composition.....	24
Metabolic QTL analysis for characterisation of the genetic potential of grapevine flavour formation .....	25
Phenolic compounds, from grape to wine .....	26
Biodiversity, microbiomes and ecosystems .....	27
Conserving biodiversity and ecosystem services in vineyards through agroecology .....	28
Microbial interactions between grapevine pathogens and the leaf microbiome.....	29
Microbial flux from grape to wine.....	30
Effects of regenerative management on vineyard soil biodiversity and climate change mitigation	31
Inter-row cover crop applications and their influence in the soil microbiome .....	32
Ecological patterns and molecular signatures in fermentation ecosystems.....	33

POSTERS .....	34
New plant biopolymers for the colloidal stability of the coloring matter of red wines.....	35
Selected Ion Flow Tube Mass Spectrometry: a promising technology for the high throughput phenotyping of grape berry volatilome .....	36
Impact of VvTPS24 genetics on farnesyl pyrophosphate bonding and production of $\alpha$ -guaiene, the rotundone direct precursor.....	37
The impact of <i>Saccharomyces</i> yeasts on wine varietal aroma, wine aging and wine longevity.....	38
Soil and climate zoning determining grapevine resource yield-gaps in Languedoc-Roussillon vineyards .....	39
Investigating the conceptualization and practices linked to peppery notes in Syrah red wines by French winemakers from different regions .....	40
Impact of different commercial <i>Saccharomyces cerevisiae</i> strains in Savatiano wines harvested at two ripening stages .....	41
Volatile and phenolic composition of Agiorgitiko wines from fifteen different regions of PDO Nemea zone.....	42
Exploring the microbiota of resistant varieties in organic farming.....	43
Diffusion of phenolic compounds during a model maceration in winemaking: role of skins, flesh, and seeds.....	44
Characterising innovations and sustainability in wine firms. An exploratory study of French wine industry.....	45
LiDAR, a tool to inform sits-specific spraying: Application in a New York Concord grape production area.....	46
New glutathionylated precursors of polyfunctional thiols in grapes: focus on Chardonnay and white interspecific cultivars grown in Belgium .....	47
Potential of N-CovSel for variable selection: a case study on time-series of multispectral images .	48
PARTICIPANTS.....	49

# INTRODUCTION

In cooperation with scientists from USA (University of California Davis, Cornell University), South Africa (Stellenbosch University) and Chile (Universidad de Chile, INIA La Platina), the Key Initiative (KIM) **Montpellier Vine & Wine Sciences**, supported by the University of Montpellier, and its partners INRAE and Institut Agro Montpellier, organized a 3-days scientific seminar on the campus Institut Agro-INRAE of Montpellier in October 2022.

This event, which follows the remote seminar organized in June 2021, brought together involved world-class scientific speakers from local and international institutions with the aim of sharing knowledge to design cooperative research programs tackling some of the current challenges of the wine industry.

One hundred and twenty scientists and staffs from fourteen countries participated in conferences and workshops, organized around four key topics:

- Adaptation and mitigation of climate change issues;
- Reduction of chemical inputs;
- Building wine quality;
- Biodiversity, microbiomes and ecosystems.

Several initiatives were formalized to combine international expertise and construct international research partnerships.

# CONFERENCES

# **Climate Change: adaptation and mitigation**



# Soil and climate zoning determining grapevine resource yield-gaps in Languedoc-Roussillon vineyards

Hugo FERNANDEZ-MENA<sup>1,2</sup>, Nicolas GUILPART<sup>3</sup>, Philippe LAGACHERIE<sup>4</sup>, Renan LE ROUX<sup>5</sup>, Mayeul PLAIGE<sup>1</sup>, Maxime DUMONT<sup>1</sup>, Marine GAUTIER<sup>1</sup>, Jean-Marc TOUZARD<sup>6</sup>, Nina GRAVELINE<sup>6</sup>, Hervé HANNIN<sup>7</sup>, Christian GARY<sup>1</sup>.

hugo.fernandez-mena@inrae.fr

<sup>1</sup> UMR ABSys, AgroBiodiversified Systems, Montpellier, France

<sup>2</sup> UMR EMMAH, Modelling of Mediterranean Agroecosystems, Avignon, France

<sup>3</sup> UFR DISC, Cropping systems of Agroparistech, Paris, France

<sup>4</sup> UMR LISAH, Interactions in Soils and Water in Agroecosystems, Montpellier, France

<sup>5</sup> U. Agroclim, Agriculture and Climate, Avignon, France

<sup>6</sup> UMR Innovation, Montpellier, France

<sup>7</sup> UMR MoISA, Markets, Institutions and Strategies in Agriculture, Montpellier, France

## Abstract

Grapevine yield has been historically overlooked, assuming a strong trade-off between grape yield and wine quality. At present, menaced by climate change, many vineyards in Southern France are far from the quality label threshold, becoming grapevine yield-gaps a major subject of concern. Although yield-gaps are well studied in arable crops, we know very little about grapevine yield-gaps. In the present study, we analysed the environmental component of grapevine yield-gaps linked to climate and soil resources in the Languedoc Roussillon. We used SAFRAN data and IGP Pays d'Oc wine yields from 2010 to 2018. We selected climate and soil indicators proving to have a significant effect on average wine yield-gaps at the municipality scale. The most significant factors of grapevine yield were the Soil Available Water Capacity; followed by the Huglin Index and the Climatic Dryness Index. The Days of Frost; the Soil pH; and the Very Hot Days were also significant. Then, we clustered geographical zones presenting similar indicators, facilitating the identification of resources yield-gaps. We discussed the number of zones with the experts of IGP Pays d'Oc label, obtaining 7 zones with similar limitations for grapevine yield. Finally, we analysed the main resources causing yield-gaps and the grapevine varieties planted on each zone. Mapping grapevine resource yield-gaps are the first stage for understanding grapevine yield-gaps at the regional scale.

**Keywords :** grapevine yield-gaps, climate and soil indicators, vineyard regional mapping, yield declining.