Le mot d'introduction

ISVV
INSTITUT DES SCIENCES DE LA VIGNE ET DU VIN
BORDEAUX AQUITAINE

Travail réalisé par la commission 'Recherche' de l'ISVV

Bonjour à tous,

Nous souhaitons partager avec vous l'analyse bibliographique menée dans le cadre des travaux de la commission Recherche de l'ISVV, avec l'appui de **Jessica Vallance** (bsa, save) et de **Clément Saint-Cast** (inrae, egfv).

Dans un premier temps, cette analyse est volontairement limitée aux sciences « dures », et porte sur les articles publiés dans des revues à comité de lecture (WOS, SCOPUS). Elle n'intègre donc pas les productions relevant des sciences humaines et sociales. Cet aspect constituera un axe d'amélioration pour la poursuite des travaux de la commission.

Cette analyse vise à mieux nous connaître, à examiner nos productions scientifiques avec objectivité et à mieux définir notre identité. Elle permet également de mettre en lumière nos points forts, d'identifier des domaines propices aux collaborations internes et d'esquisser une première cartographie de nos partenaires. En revanche, elle n'a pas pour objectif de comparer l'ISVV à d'autres instituts vigne-vin à l'échelle internationale.

Nous espérons que vous apprécierez ce travail.

N'hésitez pas à nous contacter pour toute question ou complément d'information,

Très bonnes fêtes de fin d'année,

François Delmotte

Analyse bibliométrique 2019-2024 ISVV

Clément Saint-Cast
Jessica Vallance
François Delmotte

ISVV
INSTITUT DES SCIENCES DE LA VIGNE ET DU VIN
UNIVERSITE DE BORDEAUX

Description du premier jeu de données

Web of Science

2019-2014

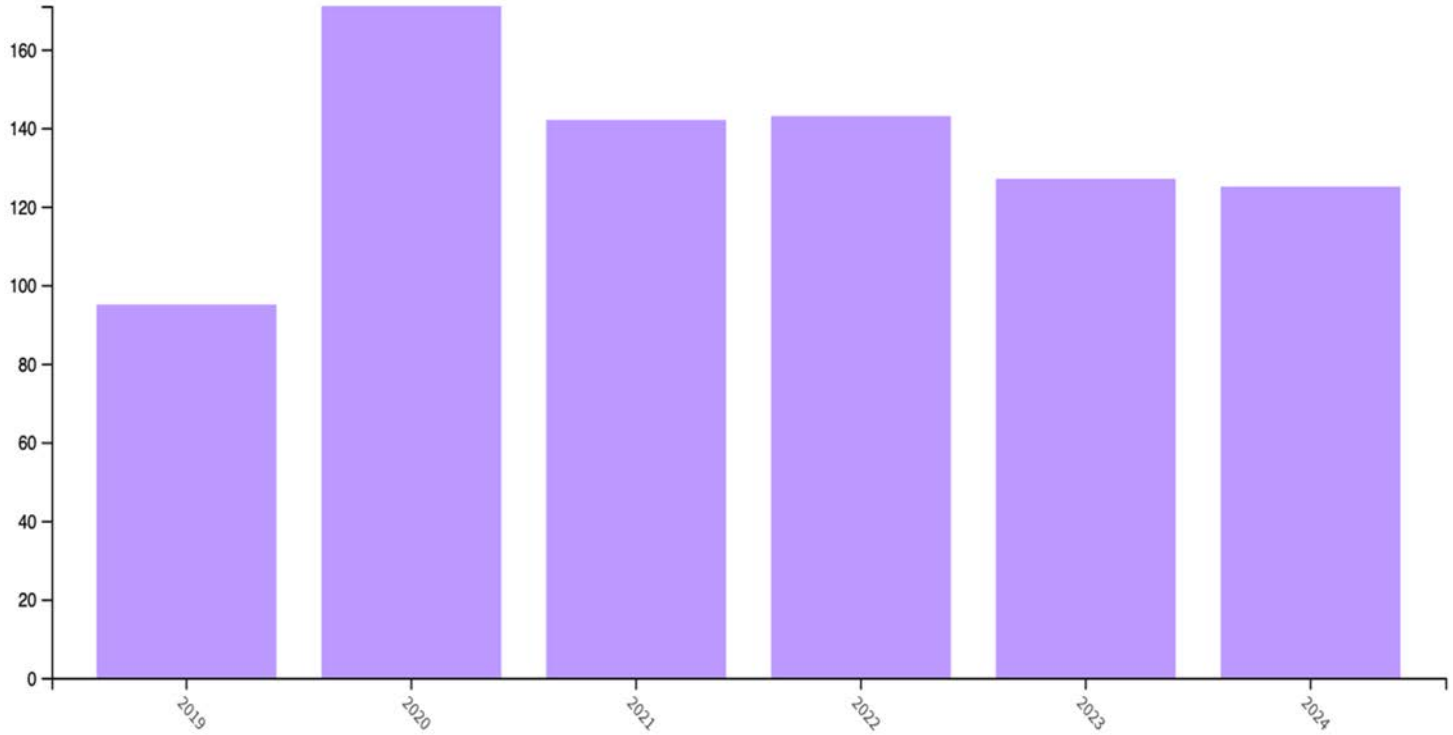
803 ACL

82 articles de synthèse

78% Open Access

292 journaux

>15 000 citations (WOS)

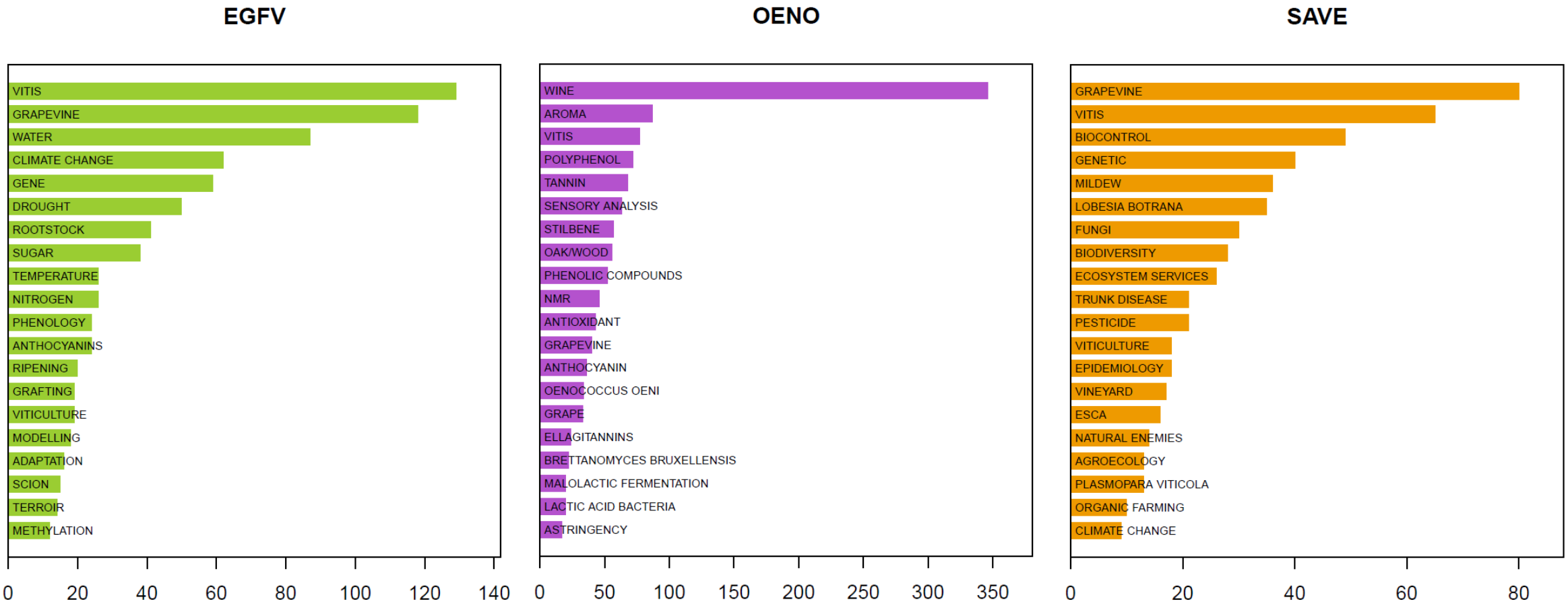


	ŒNOLOGIE	EGFV	SAVE	BFP	BSE	total
nombre ACL	384	208	234	31	8	865
WOS (fusion sans duplicats)						**803**

Domaines scientifiques

Field: Research Domains	Record Count	% of 803
Science Technology	798	99.377%
Life Sciences Biomedicine	732	91.158%
Physical Sciences	142	17.684%
Technology	17	2.117%
Social Sciences	8	0.996%
Arts Humanities	1	0.125%

Keywords par UMR

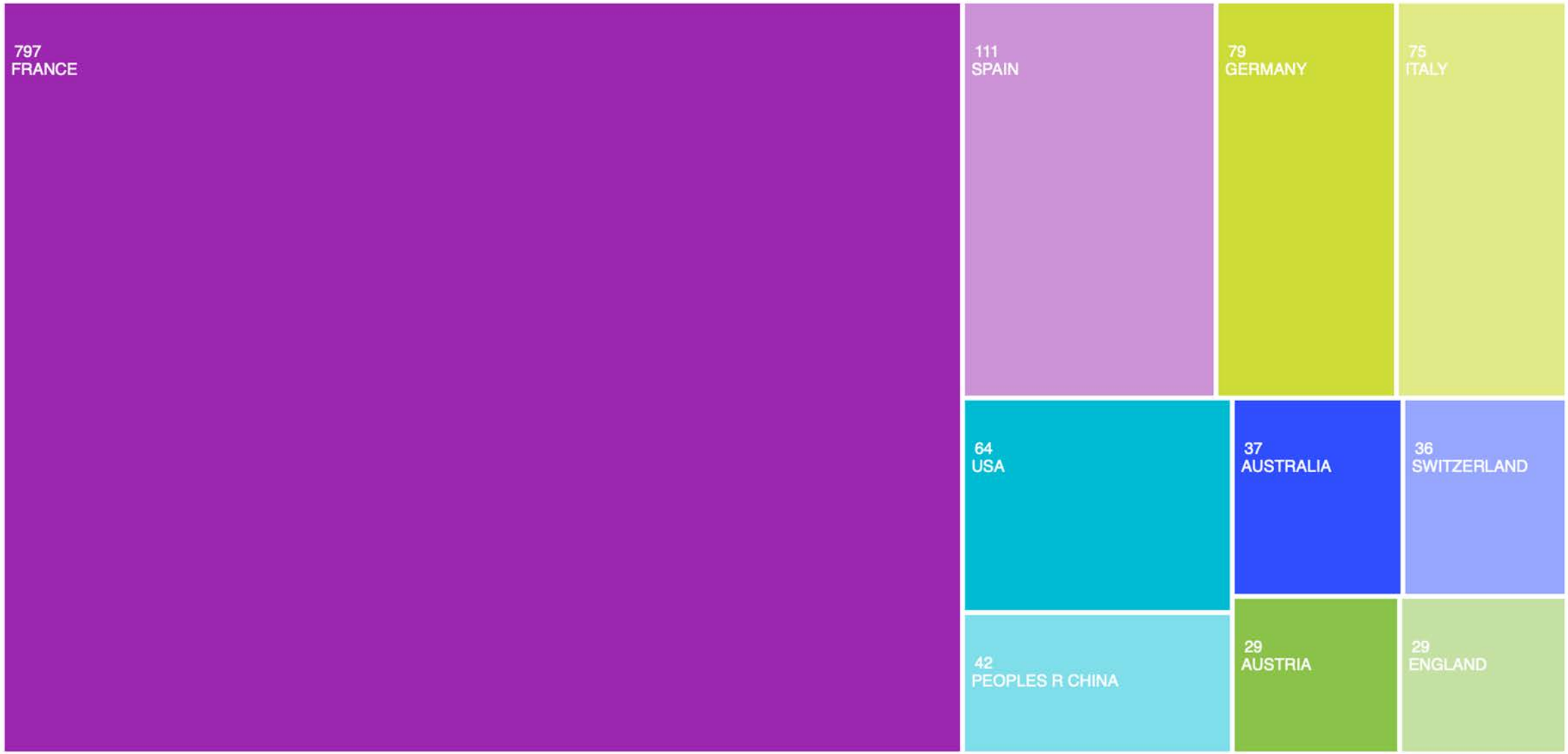


Domaines de recherche

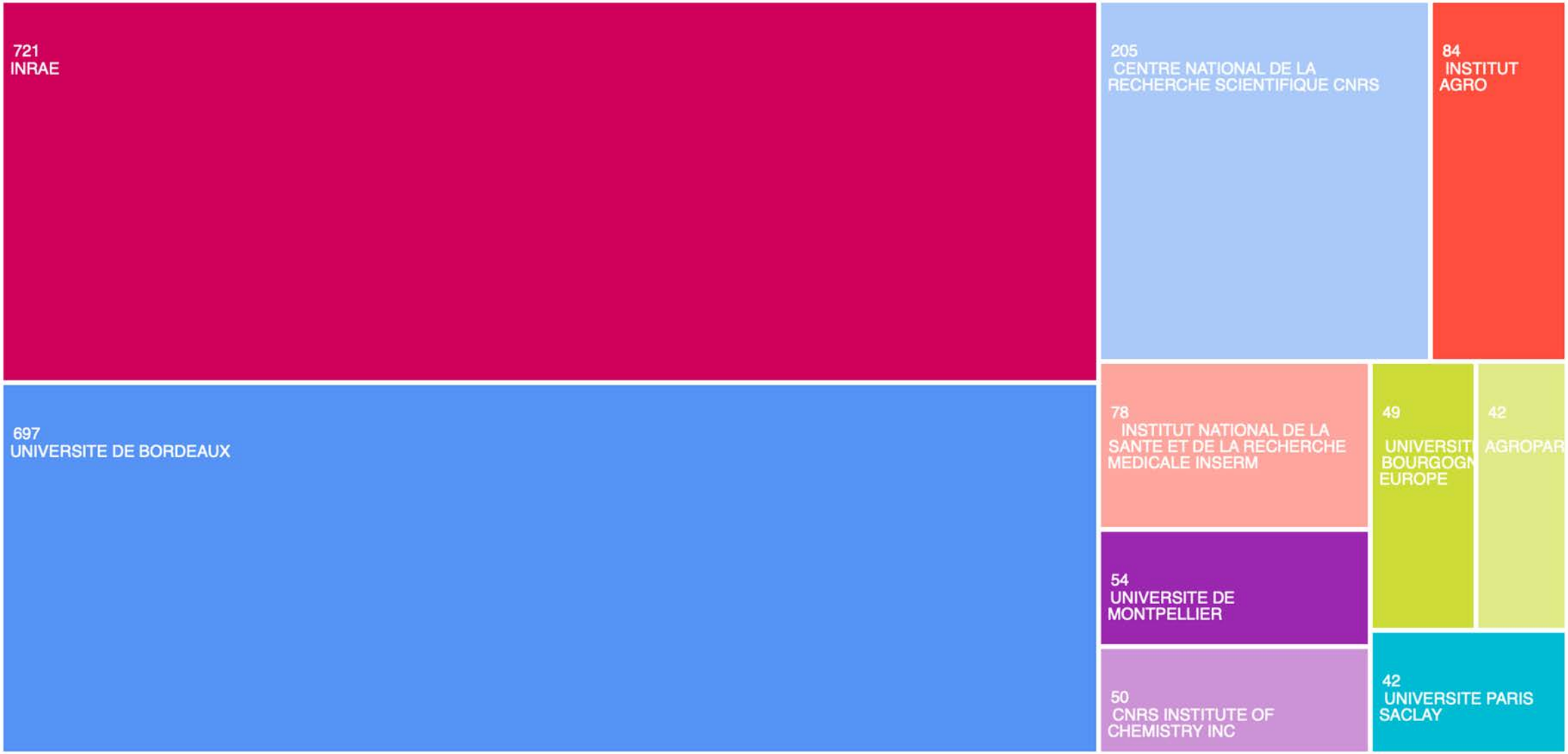
Journaux


93
OENO ONE
Oeno-One
2024
2023
2022
2021
2020
2019
0
5
10
15
20
25
33
JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY
27
FOOD CHEMISTRY
23
FRONTIERS IN PLANT SCIENCE
18
MOLECULES
15
ENTOMOLOGIA GENERALIS
12
PLANT DISEASE
12
SCIENTIFIC REPORTS
11
JOURNAL OF EXPERIMENTAL BOTANY
10
FOOD MICROBIOLOGY
10
FOODS
9
AGRICULTURE ECOSYSTEMS ENVIRONMENT
9
INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES
9
JOURNAL OF FUNGI
8
HORTICULTU
RESEARCH
7
ANTIOXIDAN
7
BMC PLANT BIOLOGY
7
FRONTIERS IN MICROBIOL
7
INTERNATIONAL JOURNAL OF FOOD MICROBIOLOGY
6
FOOD RESEARCH INTERNATIONAL
6
PEST MANAGEMENT SCIENCE
6
PHYTOPATHO
6
PLANT CELL AND ENVIRONMEN
5
ARCHIVES OF VIROLOGY
5
AUSTRALIA JOURNAL OF GRAPE AND WINE

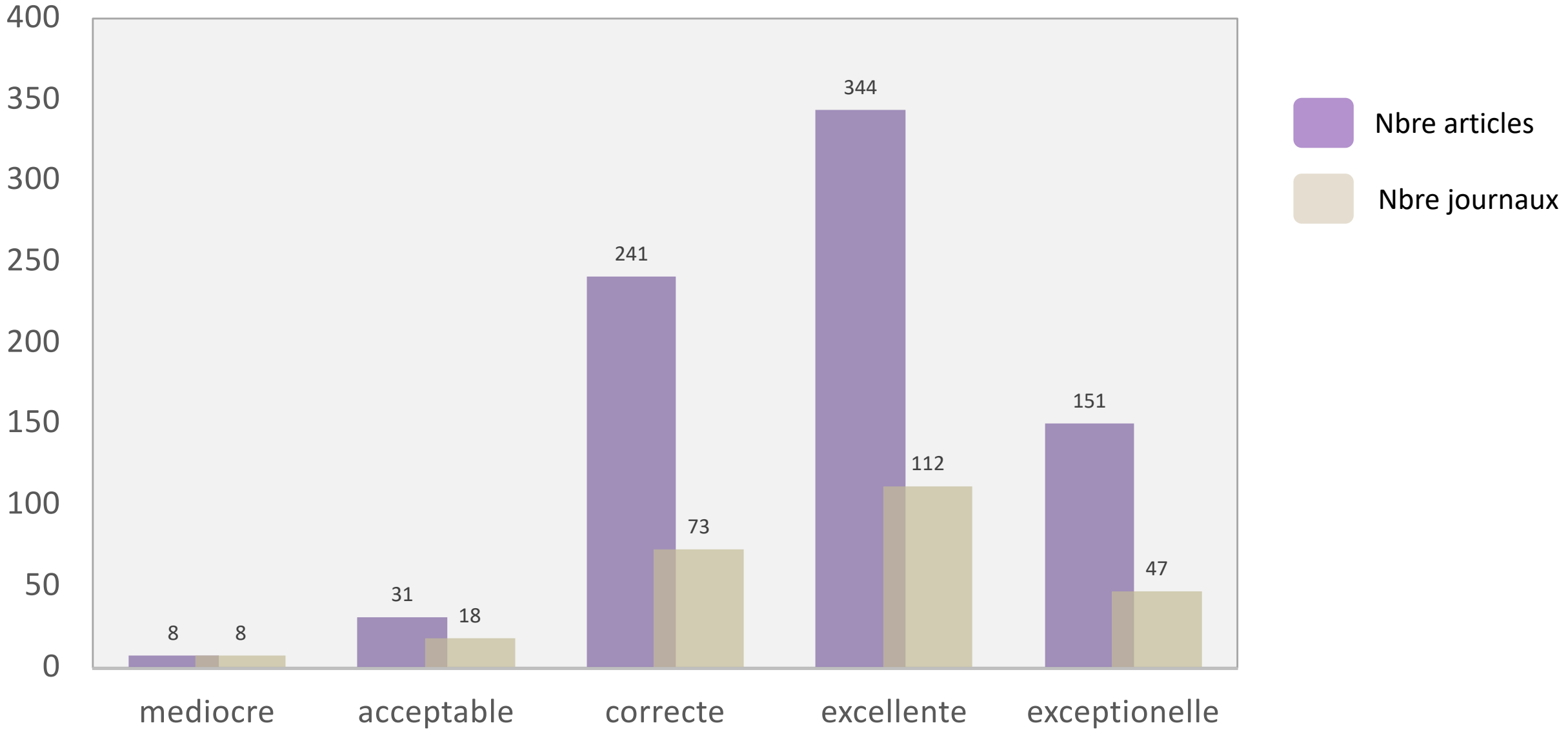
Affiliation par institut



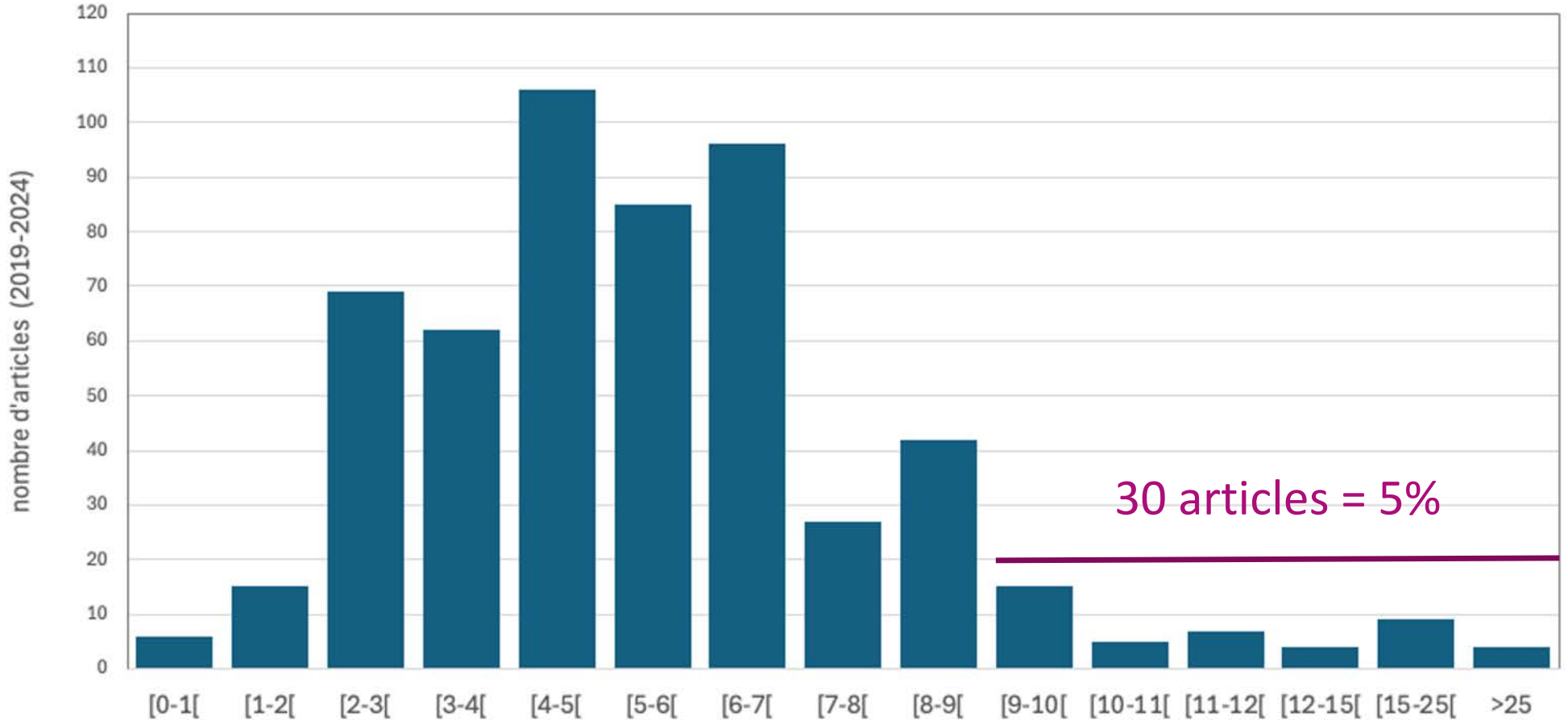
Affiliation des auteurs par pays



Classement de la collection selon le référentiel NORIA



Distribution selon le facteur d'impact des journaux



Journaux à fort impact

science	**#1**
nature reviews earth & environment	**#1**
nature sustainability	**#2**
trends in plant science	**#2**
nature communications	**#2**
proceedings of the national academy of sciences (PNAS)	**#3**
microbiome	#3
trends in food science & technology	#1
comprehensive reviews in food science and food safety	#3
science advances	#1
plant cell	#1
current biology	#2
new phytoplogist	#5

CC, physiologie, santé de la vigne

PNAS RESEARCH ARTICLE | AGRICULTURAL SCIENCES

Grapevines under drought do not express esca leaf symptoms

Giovanni Bortolami [a], Gregory A. Gambetta [b], Cédric Cassan[c,d], Silvina Dayer [b], Elena Farolfi [a], Nathalie Ferrer[a], Yves Gibon[c,d], Jérôme Jolivet[a], Pascal Lecomte [a], and Chloé E. L. Delmas [a,1]

Edited by Louis S. Santiago, University of California, Riverside, CA, and accepted by Editorial Board Member Sean R. Cutler September 1, 2021 (received for review July 13, 2021)

October 21, 2021 | 118 (43) e2112825118 | https://doi.org/10.1073/pnas.2112825118

Significance

The world is witnessing a sharp increase in perennial plant dieback. The hypothesized cause is that environmental stresses such as drought are interacting with pathogens fueling plant decline. Global viticulture has seen similar decreases in fruit yield and vine longevity. One of the hypothesized causes is a synergy between drought and the grapevine vascular disease esca, for which there is no known curative treatment. In sharp contrast to this theory, our study demonstrates that drought completely suppresses esca leaf symptoms, and although esca and drought both alter plant water transport and carbon balance, they do so in completely distinct ways. This understanding reveals the complexity and unpredictability of the stress interactions thought to drive plant mortality.

In the context of climate change, plant mortality is increasing worldwide in both natural and agroecosystems. However, our understanding of the underlying causes is limited by the complex interactions between abiotic and biotic factors and the technical challenges that limit investigations of these interactions. Here, we studied the interaction between two main drivers of mortality, drought and vascular disease (esca), in one of the world's most economically valuable fruit crops, grapevine. We found that drought totally inhibited esca leaf symptom expression. We disentangled the plant physiological response to the two stresses by quantifying whole-plant water relations (i.e., water potential and stomatal conductance) and carbon balance (i.e., CO_2 assimilation, chlorophyll, and nonstructural carbohydrates). Our results highlight the distinct physiology behind these two stress responses, indicating that esca (and subsequent stomatal conductance decline) does not result from decreases in water potential and generates different gas exchange and nonstructural carbohydrate seasonal dynamics compared to drought.

https://doi.org/10.1093/plphys/kiac361 PLANT PHYSIOLOGY 2022: 190: 1673–1686

Plant Physiology®

Research Article

Model-assisted ideotyping reveals trait syndromes to adapt viticulture to a drier climate

Silvina Dayer [1,*] Laurent J. Lamarque [2,3] Régis Burlett [3] Giovanni Bortolami [4,†] Sylvain Delzon [3] José C. Herrera [5] Hervé Cochard [6] and Gregory A. Gambetta [1]

1 EGFV, Bordeaux-Sciences Agro, INRAE, Université de Bordeaux, ISVV, Villenave d'Ornon 33882, France
2 Département des Sciences de l'Environnement, Université du Québec à Trois-Rivières, Trois-Rivières, Québec, Canada G9A 5H7
3 Univ. Bordeaux, INRAE, BIOGECO, Cestas 33610, France
4 SAVE, INRAE, BSA, ISVV, Villenave d'Ornon 33882, France
5 Institute of Viticulture and Pomology, University of Natural Resources and Life Sciences (BOKU), Tulln 3430, Austria
6 Université Clermont-Auvergne, INRAE, PIAF, Clermont-Ferrand 63000, France

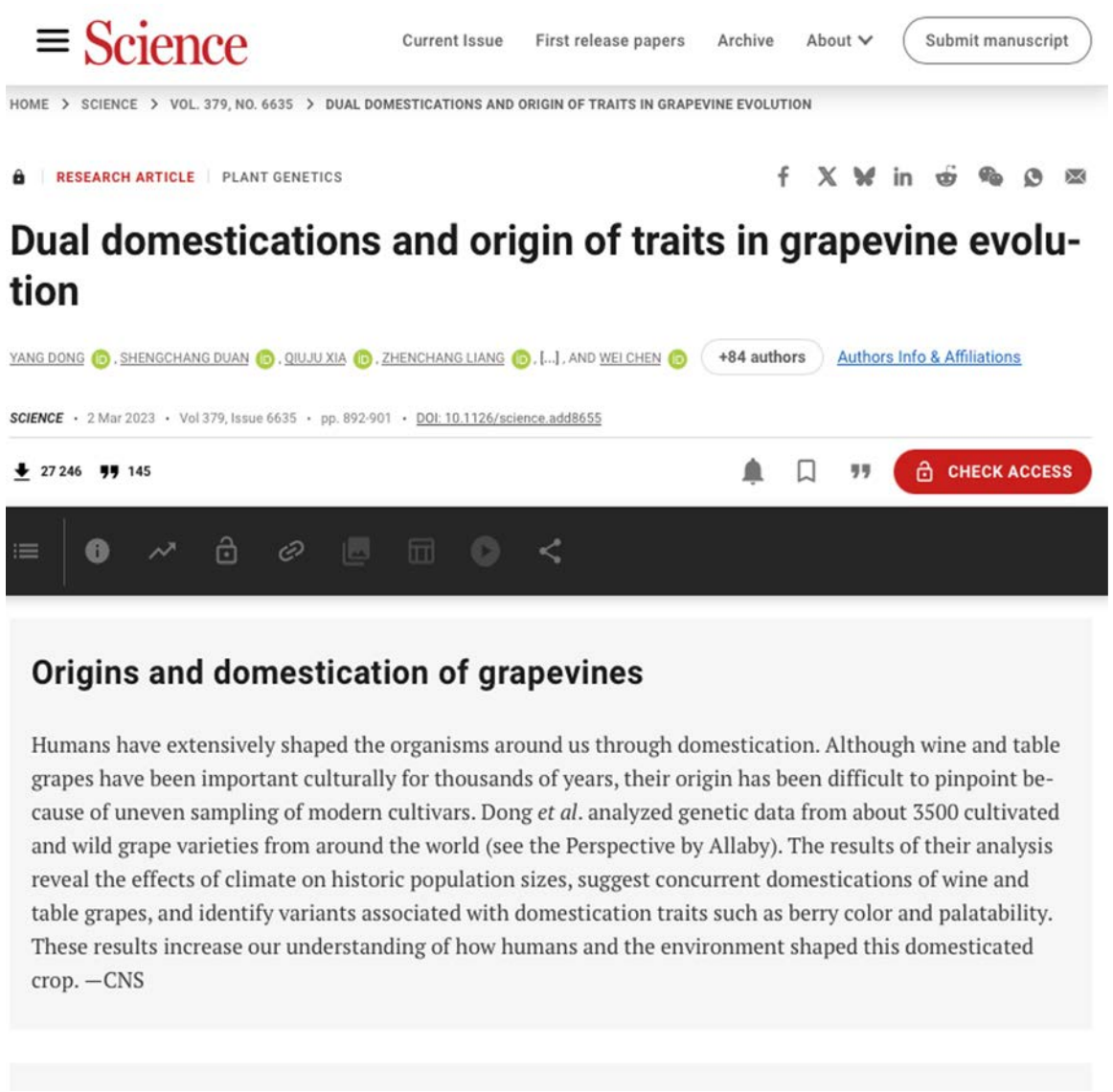
*Author for correspondence: silvinadayer@gmail.com
†Present address: Naturalis Biodiversity Center, Leiden 2300 RA, The Netherlands.

Si.D. and G.A.G.: conceptualization. Si.D. , L.J.L., R.B., G.B., and Sy.D.: methodology. Si.D., G.A.G., and H.C.: investigation. Si.D. and G.A.G.: visualization. G.A.G.: supervision. Si.D. and G.A.G.: writing—original draft. L.J.L., R.B., G.B., Sy.D., J.C.H., and H.C.: writing—review and editing.
The author responsible for distribution of materials integral to the findings presented in this article in accordance with the policy described in the Instructions for Authors (https://academic.oup.com/plphys/pages/general-instructions) is: Gregory A. Gambetta (gregory.gambetta@agro-bordeaux.fr).

Abstract

Climate change is challenging the resilience of grapevine (*Vitis*), one of the most important crops worldwide. Adapting viticulture to a hotter and drier future will require a multifaceted approach including the breeding of more drought-tolerant genotypes. In this study, we focused on plant hydraulics as a multi-trait system that allows the plant to maintain hydraulic integrity and gas exchange rates longer under drought. We quantified a broad range of drought-related traits within and across *Vitis* species, created in silico libraries of trait combinations, and then identified drought tolerant trait syndromes. By modeling the maintenance of hydraulic integrity of current cultivars and the drought tolerant trait syndromes, we identified elite ideotypes that increased the amount of time they could experience drought without leaf hydraulic failure. Generally, elites exhibited a trait syndrome with lower stomatal conductance, earlier stomatal closure, and a larger hydraulic safety margin. We demonstrated that, when compared with current cultivars, elite ideotypes have the potential to decrease the risk of hydraulic failure across wine regions under future climate scenarios. This study reveals the syndrome of traits that can be leveraged to protect grapevine from experiencing hydraulic failure under drought and increase drought tolerance.

Génétique et épigénétique de la vigne



Science

Current Issue First release papers Archive About Submit manuscript

HOME > SCIENCE > VOL. 379, NO. 6635 > DUAL DOMESTICATIONS AND ORIGIN OF TRAITS IN GRAPEVINE EVOLUTION

RESEARCH ARTICLE | PLANT GENETICS

Dual domestications and origin of traits in grapevine evolution

YANG DONG, SHENGCHANG DUAN, QIUJU XIA, ZHENCHANG LIANG, [...], AND WEI CHEN +84 authors Authors Info & Affiliations

SCIENCE • 2 Mar 2023 • Vol 379, Issue 6635 • pp. 892-901 • DOI: 10.1126/science.add8655

27 246 145 CHECK ACCESS

Origins and domestication of grapevines

Humans have extensively shaped the organisms around us through domestication. Although wine and table grapes have been important culturally for thousands of years, their origin has been difficult to pinpoint because of uneven sampling of modern cultivars. Dong *et al*. analyzed genetic data from about 3500 cultivated and wild grape varieties from around the world (see the Perspective by Allaby). The results of their analysis reveal the effects of climate on historic population sizes, suggest concurrent domestications of wine and table grapes, and identify variants associated with domestication traits such as berry color and palatability. These results increase our understanding of how humans and the environment shaped this domesticated crop. —CNS

Trends in Plant Science

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OPINION · Volume 28, Issue 2, P142-153, February 2023

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Deep inside the epigenetic memories of stressed plants

Philippe Gallusci [1] · Dolores R. Agius [2,3] · Panagiotis N. Moschou [4,5,6] · Judit Dobránszki [7] · Eirini Kaiserli [8] · Federico Martinelli [9]

Affiliations & Notes Article Info

1 Ecophysiologie et Génomique Fonctionnelle de la Vigne (EGFV), University of Bordeaux, Bordeaux Sciences Agro, INRAE, ISVV, Vill d'Ornon, France
2 Centre of Molecular Medicine and Biobanking, University of Malta, Msida, Malta
3 G.F. Abela Junior College, Ġużè Debono Square, Msida, Malta
4 Department of Plant Biology, Uppsala BioCenter, Swedish University of Agricultural Sciences and Linnean Center for Plant Biology, U Sweden
5 Department of Biology, University of Crete, Heraklion, Greece
6 Institute of Molecular Biology and Biotechnology, Foundation for Research and Technology-Hellas, Heraklion, Greece
7 Centre for Agricultural Genomics and Biotechnology, University of Debrecen, Debrecen, Hungary
8 School of Molecular Biosciences, College of Medical, Veterinary and Life Sciences, University of Glasgow, Glasgow, UK
9 Department of Biology, University of Firenze, Firenze, Italy

Highlights

Molecular mechanisms underlying the 'intelligence' of plants are far from being fully understood while they are under a profound debate in t community.

The contribution of the different types of epigenetic machinery (DNA methylation, chromatin remodeling, and RNA-mediated regulation) to c storage, elaboration, and transmission needs to be elucidated.

Epigenetic modifications are inherited through mitosis and in part through meiosis, thereby contributing to the long-term adaptation of plant climate change.

Light shed on mechanisms of plant stress memories allows to define, piece by piece, an epigenetic alphabet of plant responses to environr

The epigenetic 'orchestra' is played by hundreds of molecular players (writers, readers, erasers) that operate in a fine-tuned, coordinated m contribute to the symphony of plant intelligence even in the absence of a nervous system.

Abstract

Recent evidence sheds light on the peculiar type of plant intelligence. Plants have developed complex molecular networks that allow them tc choose, and make decisions depending on the stress stimulus, although they lack a nervous system. Being sessile, plants can exploit these optimize their resources cost-effectively and maximize their fitness in response to multiple environmental stresses. Even more interesting is transmit this experience to the next generation(s) through epigenetic modifications that add to the classical genetic inheritance. In this opinic present concepts and perspectives regarding the capabilities of plants to sense, perceive, remember, re-elaborate, respond, and to some ex their progeny information to adapt more efficiently to climate change.

Keywords

Microbiologie, Chimie du vin

Food Chemistry 461 (2024) 140801

Contents lists available at ScienceDirect

Food Chemistry

journal homepage: www.elsevier.com/locate/foodchem

Untargeted metabolomics analyses to identify a new sweet compound released during post-fermentation maceration of wine.

Marie Le Scanff[a], Laurence Marcourt[b,c], Adriano Rutz[b,c], Warren Albertin[a], Jean-Luc Wolfender[b,c], Axel Marchal[a,*]

[a] Univ. Bordeaux, Bordeaux INP, INRAE, BSA, OENO, UMR 1366, ISVV, F-33140 Villenave d'Ornon, France
[b] School of Pharmaceutical Sciences, University of Geneva, Centre Médical Universitaire (CMU), Geneva, Switzerland
[c] Institute of Pharmaceutical Sciences of Western Switzerland (ISPSO), University of Geneva, Centre Médical Universitaire (CMU), Geneva, Switzerland

ARTICLE INFO

Keywords:
Sweetness
post-fermentation maceration
untargeted metabolomics analysis
taste
wine
UHPLC -HRMS

ABSTRACT

The sensory quality of a wine is mainly based on its aroma and flavor. Sweetness contributes in the gustatory balance of red wines. The investigation of compounds involved in this flavor was based on empirical observations, such as the increase in wine sweetness during yeast autolysis, concomitant to post-fermentation maceration in red winemaking. An untargeted metabolomics approach using UHPLC-HRMS has been developed to discover a new sweet molecule released during this stage. Among several markers highlighted, one compound was selected to be isolated by various separative techniques. It was unambiguously identified by NMR as N6-succinyladenosine and is reported for the first time in wine at an average concentration of 3.16 mg/L in 85 red wines. Furthermore, sensory analysis has highlighted its sweetness. In addition to discovering a new sweet compound in wine, this study proposes new tools for studying taste-active compounds in natural matrices.

Food Chemistry 426 (2023) 136405

Contents lists available at ScienceDirect

Food Chemistry

journal homepage: www.elsevier.com/locate/foodchem

Highlighting the varietal origin of eugenol in Armagnac wine spirits from Baco blanc, a hybrid grape variety

Céline Franc[a,*], Laurent Riquier[a], Xavier Hastoy[a], Clémence Monsant[a], Paul Noiville[a], Edouard Pelonnier-Magimel[a], Stéphanie Marchand[a], Sophie Tempère[a], Marie-Claude Ségur[b], Gilles de Revel[a,*]

[a] Univ. Bordeaux, INRAE, Bordeaux INP, Bordeaux Sciences Agro, UMR 1366, OENO, ISVV, Villenave d'Ornon F-33140, France
[b] Bureau National Interprofessionnel de l'Armagnac (BNIA), Eauze 32800, France

ARTICLE INFO

Keywords:
Direct producer hybrid
Baco 22A
Tolerant variety
Must
Wine
Glycosides
SPME-GC-MS
Chemical compound studied in this article:
Eugenol (PubChem CID 3314)

ABSTRACT

We report on the first evidence of a varietal origin of eugenol as a molecular marker in Baco blanc, one of the grape varieties used to produce Armagnac. Eugenol was identified and quantified by HS-SPME-GC-MS. For two separate vintages, the concentrations found in monovarietal wine spirits made from Baco blanc, were, on average, 10 times higher than those in other *Vitis* varieties, ranging from 31.0 to 174.7 µg/L. Investigations were carried out to quantify eugenol in the wines used for distillation, in the musts and finally in several parts of the plant. For all matrices over both vintages, it was confirmed that eugenol is much more abundant in Baco blanc than in Ugni blanc and Folle blanche. Moreover, enzymatic hydrolysis made it possible to release a significant quantity of eugenol from precursors, demonstrating that more than 90% of eugenol is bound in the must and in the grape berry pulp.

International Journal of Food Microbiology 400 (2023) 110276

Contents lists available at ScienceDirect

International Journal of Food Microbiology

journal homepage: www.elsevier.com/locate/ijfoodmicro

Alcoholic fermentation drives the selection of *Oenococcus oeni* strains in wine but not in cider

Aitor Balmaseda[a,b,c,*,1], Marc Lorentzen[a,b,1], Lucie Dutilh[a,b], Rémi Bauduin[d], Hugues Guichard[d], Séverine Ollivier[d], Cécile Miot-Sertier[a,b], Patrick M. Lucas[a,b]

[a] Univ. Bordeaux, INRAE, Bordeaux INP, UMR 1366, OENO, ISVV, F-33140 Villenave d'Ornon, France
[b] Bordeaux Sciences Agro, F-33170 Gradignan, France
[c] Universitat Rovira i Virgili, Departament de Bioquímica i Biotecnologia, Facultat d'Enologia, Grup de Biotecnologia Enològica, C/Marcel·lí Domingo 1, 43007 Tarragona, Catalonia, Spain
[d] Institut Français des Produits Cidricoles (IFPC), Domaine de la Motte, Le Rheu 35653, France

ARTICLE INFO

Keywords:
Oenococcus oeni
Phylogroups
Population dynamics
Wine
Malolactic fermentation

ABSTRACT

Oenococcus oeni is the predominant lactic acid bacteria species in wine and cider, where it performs the malolactic fermentation (MLF). The *O. oeni* strains analyzed to date form four major genetic lineages named phylogroups A, B, C and D. Most of the strains isolated from wine, cider, or kombucha belong to phylogroups A, B + C, and D, respectively, although B and C strains were also detected in wine. This study was performed to better understand the distribution of the phylogroups in wine and cider. Their population dynamics were determined by qPCR all through wine and cider productions, and the behavior of the strains was analyzed in synthetic wines and ciders. Phylogroups A, B and C were all represented in grape must and throughout the alcoholic fermentation, but on the transition to MLF, only phylogroup A remained at high levels in all wine productions. In the case of cider, phylogroups A, B and C were detected in stable levels during the process. When they were tested in synthetic wine and cider, all phylogroups performed MLF, but with different survival rates depending on the ethanol content. In this sense, ethanol and fermentation kinetics are the main agent that drives the selection of phylogroup A strains in wine, while B and C strains dominates in cider containing less ethanol.

Adaptation au changement climatique

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Review Article | Published: 26 March 2024

Climate change impacts and adaptations of wine production

Cornelis van Leeuwen, Giovanni Sgubin, Benjamin Bois, Nathalie Ollat, Didier Swingedouw, Sébastien Zito & Gregory A. Gambetta

Nature Reviews Earth & Environment **5**, 258–275 (2024) | Cite this article

20k Accesses | **86** Citations | **1828** Altmetric | Metrics

Abstract

Climate change is affecting grape yield, composition and wine quality. As a result, the geography of wine production is changing. In this Review, we discuss the consequences of changing temperature, precipitation, humidity, radiation and CO_2 on global wine production and explore adaptation strategies. Current winegrowing regions are primarily located at mid-latitudes (California, USA; southern France; northern Spain and Italy; Barossa, Australia; Stellenbosch, South Africa; and Mendoza, Argentina, among others), where the climate is warm enough to allow grape ripening, but without excessive heat, and relatively dry to avoid strong disease pressure. About 90% of traditional wine regions in coastal and lowland regions of Spain, Italy, Greece and southern California could be at risk of disappearing by the end of the century because of excessive drought and more frequent heatwaves with climate change. Warmer temperatures might increase suitability for other regions (Washington State, Oregon, Tasmania, northern France) and are driving the emergence of new wine regions, like the southern United Kingdom. The degree of these changes in suitability strongly depends on the level of temperature rise. Existing producers can adapt to a certain level of warming by changing plant material (varieties and rootstocks), training systems and vineyard management. However, these adaptations might not be enough to maintain economically viable wine production in all areas. Future research should aim to assess the economic impact of climate change adaptation strategies applied at large scale.

Received: 16 May 2022 | Revised: 13 September 2022 | Accepted: 30 September 2022

DOI: 10.1111/gcb.16493

RESEARCH ARTICLE

Global Change Biology WILEY

Non-linear loss of suitable wine regions over Europe in response to increasing global warming

Giovanni Sgubin[1] | Didier Swingedouw[1] | Juliette Mignot[2] | Gregory Alan Gambetta[3] | Benjamin Bois[4] | Harilaos Loukos[5] | Thomas Noël[5] | Philippe Pieri[3] | Iñaki García de Cortázar-Atauri[6] | Nathalie Ollat[3] | Cornelis van Leeuwen[3]

[1]Environnements et Paléoenvironnements Océaniques et Continentaux (EPOC)—Université de Bordeaux, Pessac, France

[2]LOCEAN Laboratory, Institut Pierre Simon, Sorbonne Universités (SU/CNRS/IRD/MNHN), Paris, France

[3]EGFV, Bordeaux Sciences Agro, INRAE, ISVV, Univ. Bordeaux, Villenave d'Ornon, France

[4]Centre de Recherches de Climatologie, UMR 6282 CNRS/UB Biogéosciences, Univ. Bourgogne-Franche-Comté, Dijon, France

[5]The Climate Data Factory (TCDF), Paris, France

[6]INRAE, US AgroClim, Avignon, France

Correspondence
Giovanni Sgubin, Environnements et Paléoenvironnements Océaniques et Continentaux (EPOC)—Université de Bordeaux, Pessac, France.
Email: giovanni.sgubin@u-bordeaux.fr

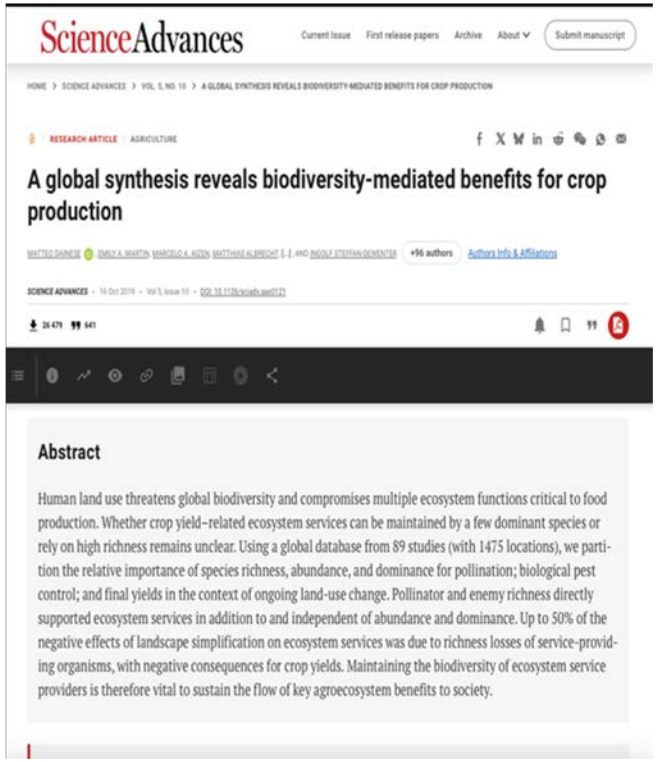
Funding information
European Union's Horizon 2020 EUCP, Grant/Award Number: 776613

Abstract

Evaluating the potential climatic suitability for premium wine production is crucial for adaptation planning in Europe. While new wine regions may emerge out of the traditional boundaries, most of the present-day renowned winemaking regions may be threatened by climate change. Here, we analyse the future evolution of the geography of wine production over Europe, through the definition of a novel climatic suitability indicator, which is calculated over the projected grapevine phenological phases to account for their possible contractions under global warming. Our approach consists in coupling six different de-biased downscaled climate projections under two different scenarios of global warming with four phenological models for different grapevine varieties. The resulting suitability indicator is based on fuzzy logic and is calculated over three main components measuring (i) the timing of the fruit physiological maturity, (ii) the risk of water stress and (iii) the risk of pests and diseases. The results demonstrate that the level of global warming largely determines the distribution of future wine regions. For a global temperature increase limited to 2°C above the pre-industrial level, the suitable areas over the traditional regions are reduced by about 4%/°C rise, while for higher levels of global warming, the rate of this loss increases up to 17%/°C. This is compensated by a gradual emergence of new wine regions out of the traditional boundaries. Moreover, we show that reallocating better-suited grapevine varieties to warmer conditions may be a viable adaptation measure to cope with the projected suitability loss over the traditional regions. However, the effectiveness of this strategy appears to decrease as the level of global warming increases. Overall, these findings suggest the existence of a safe limit below 2°C of global warming for the European winemaking sector, while adaptation might become far more challenging beyond this threshold.

KEYWORDS
adaptation to climate change, climate change, general circulation model, phenological model, *Vitis vinifera* L.

Biodiversité et solutions basées sur la nature



Science Advances

A global synthesis reveals biodiversity-mediated benefits for crop production

Abstract

Human land use threatens global biodiversity and compromises multiple ecosystem functions critical to food production. Whether crop yield–related ecosystem services can be maintained by a few dominant species or rely on high richness remains unclear. Using a global database from 89 studies (with 1475 locations), we partition the relative importance of species richness, abundance, and dominance for pollination; biological pest control; and final yields in the context of ongoing land-use change. Pollinator and enemy richness directly supported ecosystem services in addition to and independent of abundance and dominance. Up to 50% of the negative effects of landscape simplification on ecosystem services was due to richness losses of service-providing organisms, with negative consequences for crop yields. Maintaining the biodiversity of ecosystem service providers is therefore vital to sustain the flow of key agroecosystem benefits to society.

ECOLOGY LETTERS

Letter

The interplay of landscape composition and configuration: new pathways to manage functional biodiversity and agroecosystem services across Europe

Emily A. Martin, Matteo Dainese, Yann Clough, András Báldi, Riccardo Bommarco, Vesna Gagic, Michael P.D. Garratt, Andrea Holzschuh, David Kleijn ... See all authors

First published: 07 April 2019 | https://doi.org/10.1111/ele.13265 | Citations: 463

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Abstract

Managing agricultural landscapes to support biodiversity and ecosystem services is a key aim of a sustainable agriculture. However, how the spatial arrangement of crop fields and other habitats in landscapes impacts arthropods and their functions is poorly known. Synthesising data from 49 studies (1515 landscapes) across Europe, we examined effects of landscape composition (% habitats) and configuration (edge density) on arthropods in fields and their margins, pest control, pollination and yields. Configuration effects interacted with the proportions of crop and non-crop habitats, and species' dietary, dispersal and overwintering traits led to contrasting responses to landscape variables. Overall, however, in landscapes with high edge density, 70% of pollinator and 44% of natural enemy species reached highest abundances and pollination and pest control improved 1.7- and 1.4-fold respectively. Arable-dominated landscapes with high edge densities achieved high yields. This suggests that enhancing edge density in European agroecosystems can promote functional biodiversity and yield-enhancing ecosystem services.

Nature Ecology and evolution

nature > nature ecology & evolution > articles > article

Article | Published: 14 November 2022

The supply of multiple ecosystem services requires biodiversity across spatial scales

Gaëtane Le Provost, Noëlle V. Schenk, Caterina Penone, Jan Thiele, Catrin Westphal, Eric Allan, Manfred Ayasse, Nic Blüthgen, Runa S. Boeddinghaus, Andrea Larissa Boesing, Ralph Bolliger, Verena Busch, Markus Fischer, Martin M. Gos Norbert Hölzel, Kirsten Jung, Ellen Kandeler, Valentin H. Klaus, Till Kleinebecker, Sophia Leimer, Sven Marhan, Kathryn Sandra Müller, Felix Neff, ... Peter Manning + Show authors

Nature Ecology & Evolution 7, 236–249 (2023) | Cite this article

11k Accesses | 119 Citations | 249 Altmetric | Metrics

Abstract

The impact of local biodiversity loss on ecosystem functioning is well established, but the role of larger-scale biodiversity dynamics in the delivery of ecosystem services remains poorly understood. Here we address this using a comprehensive dataset describing the supply of 16 cultural, regulating and provisioning ecosystem se 150 European agricultural grassland plots, and detailed multi-scale data on land use and plant diversity. After controlling for land-use and abiotic factors, we show that both plot-level and surrounding plant diversity play important role in the supply of cultural and aboveground regulating ecosystem services. In contrast, provisio belowground regulating ecosystem services are more strongly driven by field-level management and abiotic f Structural equation models revealed that surrounding plant diversity promotes ecosystem services both dire probably by fostering the spill-over of ecosystem service providers from surrounding areas, and indirectly, by maintaining plot-level diversity. By influencing the ecosystem services that local stakeholders prioritized, bio at different scales was also shown to positively influence a wide range of stakeholder groups. These results pro comprehensive picture of which ecosystem services rely most strongly on biodiversity, and the respective sca biodiversity that drive these services. This key information is required for the upscaling of biodiversity–ecosy service relationships, and the informed management of biodiversity within agricultural landscapes.

PNAS RESEARCH ARTICLE | SUSTAINABILITY SCIENCE

Both long-term grasslands and crop diversity are needed to limit pest and weed infestations in agricultural landscapes

Thomas Perrot [a,b,1], Adrien Rusch [b], Sabrina Gaba [a,c,d], and Vincent Bretagnolle [a,c]

Edited by Ivette Perfecto, University of Michigan, Ann Arbor, MI; received January 17, 2023; accepted October 6, 2023

November 27, 2023 | 120 (49) e2300861120 | https://doi.org/10.1073/pnas.2300861120

Significance

Increasing landscape heterogeneity through crop diversity and amount of seminatural habitats have both been suggested to improve natural pest control in arable fields. However, despite decades of research, very little is known about the respective contributions of the various components of landscape heterogeneity in reducing weed and insect pest infestations in arable fields. We show that among landscape features, grasslands rather than woody elements, and long-term grasslands rather than temporary grasslands (hay), increased the top–down control of insect pests, especially in crops where pest infestation was high. Conversely, weed control was best explained by crop diversity at the landscape scale. Our findings suggest that public policies should target landscape mosaics harboring long-term grasslands and crop diversification.

Increasing landscape heterogeneity has been suggested to be an important strategy to strengthen natural pest control in crops, especially through enhancing the amount of seminatural habitats. Increasing crop diversity is also a promising strategy to complement or replace seminatural habitat when seminatural habitat is scarce. However, their relative or possibly interactive effects on pest and weed infestation remain poorly investigated, and the role of different types of seminatural habitats has been understudied. Using an extensive sampling effort in 974 arable fields across 7 y, we evaluated the separate and interactive effects of crop diversity (seven arable crop types) and the amount of four types of seminatural habitats (meadows, hay, forests, and hedgerows) in the landscape on pest and weed control. Meadows and crop diversity, respectively, supported insect pest and weed control services in agricultural landscapes through a complementarity effect. Crop diversity increased weed seed predation rate (by 16%) and reduced weed infestation (by 6%), whereas long-term grasslands (to a much higher degree than hay or woody habitats) increased insect pest predation rates (by 23%) and reduced pest infestation (by 19%) in most arable crops. Our results demonstrate that diversification of the agricultural landscape requires long-term grasslands as well as improved crop diversity to ensure the delivery of efficient pest and weed control services.

Articles de synthèses

ELSEVIER

Trends in Food Science & Technology

Volume 112, June 2021, Pages 362-381

Stilbenes in grape berries and wine and their potential role as anti-obesity agents: A review

Nawel Benbouguerra [a 1], Ruth Hornedo-Ortega [b 1], François Garcia [a], Toni El Khawand [b], Cédric Saucier [a] ✉, Tristan Richard [b] ✉

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https://doi.org/10.1016/j.tifs.2021.03.060 Get rights and content

Highlights

- Grape berries and wines are among the major sources of stilbenes in human nutrition.
- Red wines contain more complex stilbenes than white wines.
- Stilbenes could reduce obesity by regulating different pathways.
- Some stilbenes show better anti-obesity activities than resveratrol.
- Combination of stilbenes with others polyphenols give promising results.

Trends in Plant Science

CellPress

Volume 28, Issue 5, May 2023, Pages 537-543

Opinion

Special issue: Food security

PlantACT! – how to tackle the climate crisis

Heribert Hirt [1] ✉, Salim Al-Babili [1], Marilia Almeida-Trapp [2], Antoine Martin [3], Manuel Aranda [4], Dorothea Bartels [5], Malcolm Bennett [6], Ikram Blilou [1], Damian Boer [7], Alix Boulouis [8], Chris Bowler [9], Sophie Brunel-Muguet [10], Fabien Chardon [11], Jean Colcombet [12], Vincent Colot [13], Agata Daszkowska-Golec [14], Jose R. Dinneny [44], Ben Field [16], Katja Froehlich [1], Catherine H. Gardener [1]...Iain M. Young [1]

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https://doi.org/10.1016/j.tplants.2023.01.005 Get rights and content

Highlights

Agriculture contributes to global climate change by producing 20–25% of greenhouse gases (GHGs).

CO_2 is released from deforestation and land conversion, methane from rice paddy fields, and nitrous oxides from overfertilization.

An increasing world population requires a change in the agro food systems, including a reduction in chemical fertilizers and pesticides as well as the production and access to food.

Critical Reviews in Food Science and Nutrition

Volume 59, 2019 - Issue 1

Submit an article Journal homepage

2,898 Views

102 CrossRef citations to date

9 Altmetric

Reviews

Relationship between wine composition and temperature: Impact on Bordeaux wine typicity in the context of global warming—Review

Julie Drappier, Cécile Thibon, Amélie Rabot ✉ & Laurence Geny-Denis

Pages 14-30 | Received 18 Apr 2017, Accepted 12 Jul 2017, Published online: 24 Oct 2017

Cite this article https://doi-org.docelec.u-bordeaux.fr/10.1080/10408398.2017.1355776

etc.

Matrice des co-publications egfv-oeno-save [2019-2024]

Les co-publications entre les unités de l'institut représentent environ 12% des publications totales.

	BFP	BSE	EGFV	OENO	SAVE
BFP	**31**	0	10	6	14
BSE		**8**	1	1	1
EGFV			**208**	27	17
OENO				**384**	21
SAVE					**234**

NB : Parmi ces articles, on trouve #3 articles regroupant 3 unités, et #1 article regroupant 4 unités de l'ISVV.

Description des articles en co-publications

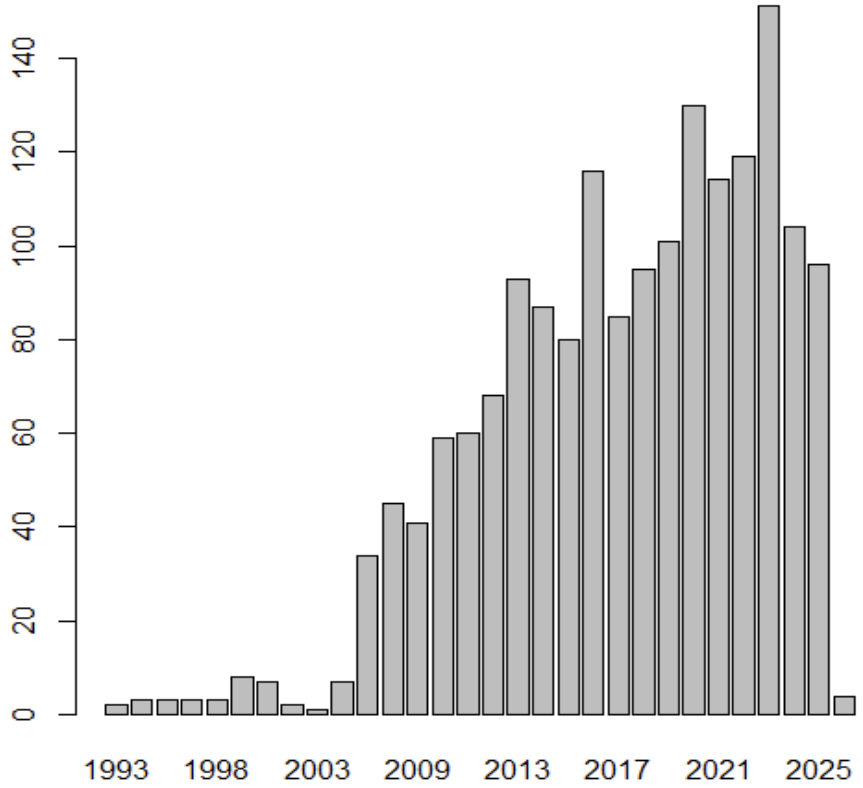
AGRICULTURAL SCIENCES	nombre d'articles
Correcte	15
Excellente	4
Exceptionnelle	7
BIOLOGY & BIOCHEMISTRY	
Correcte	2
Excellente	1
CHEMISTRY	
Excellente	1
ECONOMICS & BUSINESS	
Excellente	1
ENVIRONMENT/ECOLOGY	
Correcte	1
Excellente	3
Exceptionnelle	2

MICROBIOLOGY	
Acceptable	1
Correcte	2
Excellente	2
MOLECULAR BIOLOGY & GENETICS	
Correcte	1
MULTIDISCIPLINARY	
Correcte	3
Exceptionnelle	4
PLANT & ANIMAL SCIENCE	
Acceptable	1
Correcte	7
Excellente	22
Exceptionnelle	8
SOCIAL SCIENCES, GENERAL	
Excellente	1

Liste complète des articles entre unités [DOI]

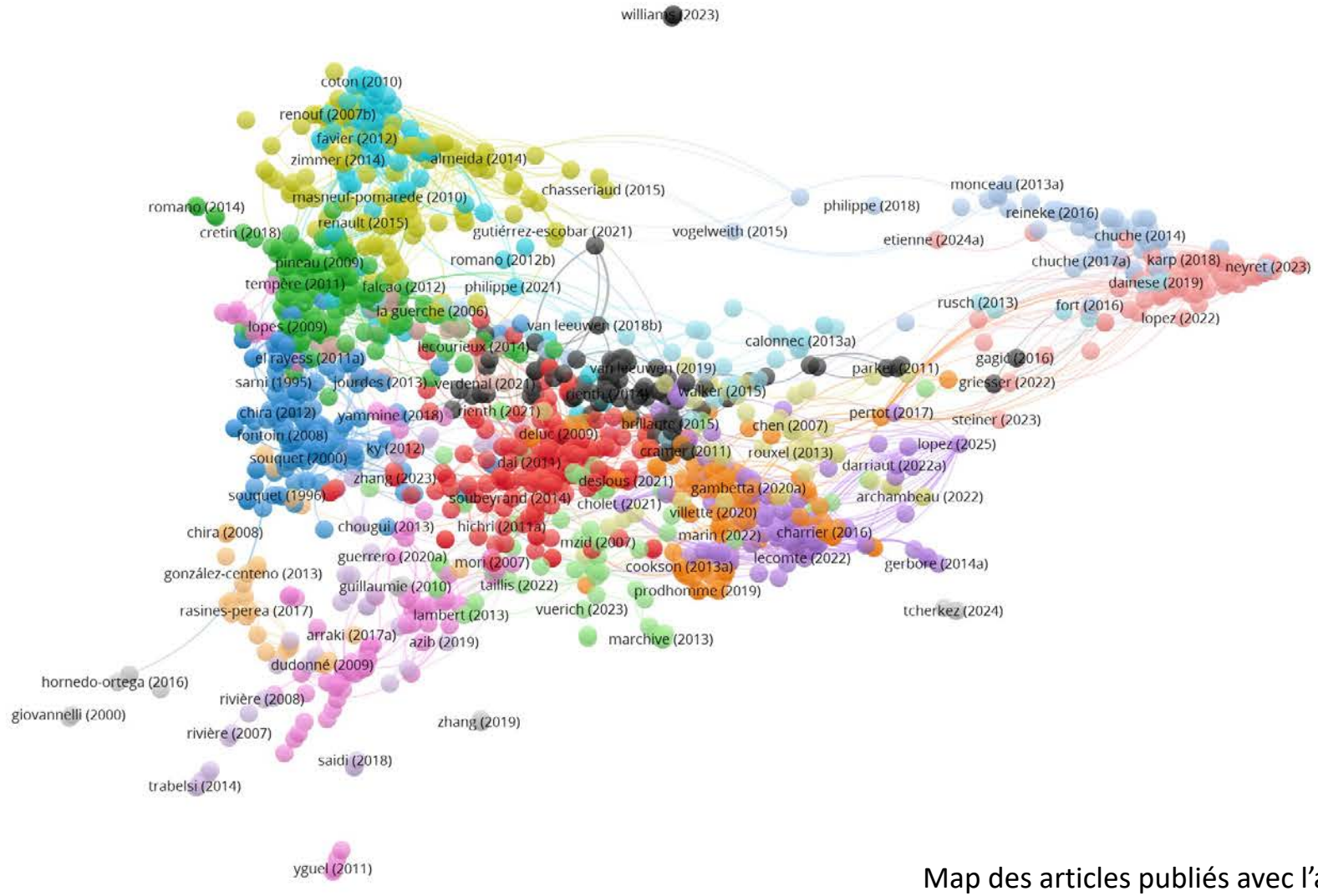
- 0.1007/s00705-024-06091-7
- 10.1016/j.phytol.2019.02.009
- 10.1007/s11829-024-10073-6
- 10.3390/v16030392
- 10.20870/oeno-one.2024.58.4.8163
- 10.20870/oeno-one.2024.58.2.8043
- 10.20870/oeno-one.2024.58.3.7876
- 10.1007/s11306-023-02028-4
- 10.1038/s41598-023-34224-6
- 10.1094/PHYTO-03-23-0095-R
- 10.20870/oeno-one.2023.57.3.7458
- 10.20870/oeno-one.2023.57.2.7405
- 10.20870/oeno-one.2023.57.2.7454
- 10.20870/oeno-one.2023.57.2.7399
- 10.1038/s41598-022-26551-x
- 10.1016/j.apsoil.2022.104767
- 10.36253/phyto-13357
- 10.3389/fevo.2022.850272
- 10.1094/PHYTO-10-21-0449-R
- 10.3390/genes13071256
- 10.1111/afe.12520
- 10.20870/oeno-one.2022.56.2.5441
- 10.3390/v13030375
- 10.20870/oeno-one.2021.55.1.4478
- 10.20870/oeno-one.2021.55.3.4626
- 10.20870/oeno-one.2021.55.2.4623
- 10.20870/oeno-one.2020.54.2.2954
- 10.20870/oeno-one.2020.54.4.3983
- 10.1371/journal.pone.0222586
- 10.1007/s11306-019-1530-5
- 10.20870/oeno-one.2019.53.1.2361
- 10.1016/bs.abr.2024.02.013
- 10.1016/bs.abr.2020.11.003
- 10.1186/s12870-024-05875-y
- 10.1016/j.scitotenv.2024.174709
- 10.3390/jof10070471
- 10.3389/fpls.2024.1358213
- 10.1094/PDIS-09-23-1751-PDN
- 10.1093/aob/mcad188
- 10.1371/journal.pcbi.1011399
- 10.1111/tpj.16409
- 10.3389/fmicb.2023.1181562
- 10.1002/jsfa.12444
- 10.1093/treephys/tpac133
- 10.1016/j.ecolecon.2022.107663
- 10.3389/fmicb.2022.1031064
- 10.3390/horticulturae8080681
- 10.1016/j.jrurstud.2022.05.021
- 10.3390/jof7070498
- 10.3389/fpls.2021.695846
- 10.1016/j.foodchem.2021.130120
- 10.3390/ijms22084026
- 10.1094/PDIS-11-20-2348-PDN
- 10.1093/jxb/erab117
- 10.1016/j.envexpbot.2021.104400
- 10.1093/jxb/erab040
- 10.1093/jxb/eraa302
- 10.1111/1462-2920.15180
- 10.1093/aob/mcaa082
- 10.1093/jxb/eraa186
- 10.1016/j.foodchem.2020.126334
- 10.1186/s12870-020-2310-0
- 10.1094/PDIS-04-19-0696-PDN
- 10.1186/s12870-020-2258-0
- 10.1186/s12870-019-2055-9
- 10.3389/fpls.2019.00836
- 10.1094/PDIS-10-18-1747-RE
- 10.1016/bs.aecr.2022.09.001
- 10.1127/entomologia/2023/2597
- 10.1127/entomologia/2023/2598
- 10.1111/pce.14693
- 10.1016/j.envint.2023.107975
- 10.1126/science.add8655
- 10.1016/j.agee.2022.108292
- 10.1093/plphys/kiac361
- 10.1093/hr/uhac019
- 10.1093/hr/uhab070
- 10.1073/pnas.2112825118
- 10.1038/s41467-021-24283-6
- 10.1111/nph.17260
- 10.1021/acs.jafc.0c06103
- 10.1021/acs.jafc.0c04907
- 10.1021/acs.jafc.9b08099
- 10.1111/pce.13923
- 10.1111/pce.13848
- 10.1016/j.agrformet.2020.107902
- 10.1073/pnas.1906731117
- 10.1104/pp.19.00591
- 10.1021/acs.jafc.9b00591
- 10.1186/s43170-024-00273-8
- 10.1186/s43897-024-00100-8
- 10.1016/j.dib.2019.105015

Réseau de publication au sein de l'ISVV [lien=auteur]



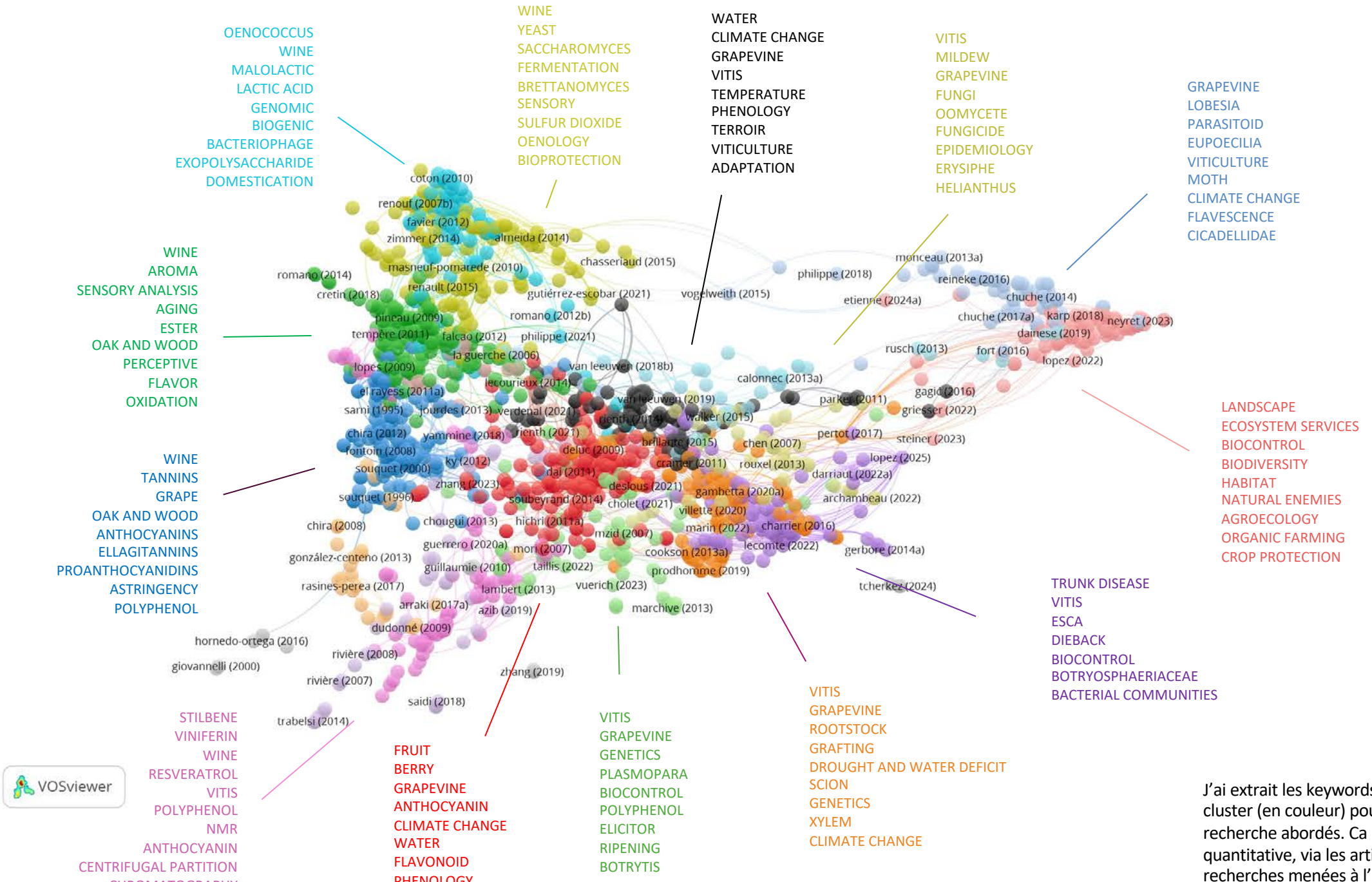
→ Pour cette analyse, nous avons sélectionné 1734 articles avec une affiliation ISVV dans la base de données SCOPUS (1993-2025)

Réseau de publication au sein de l'ISVV [lien=auteur]



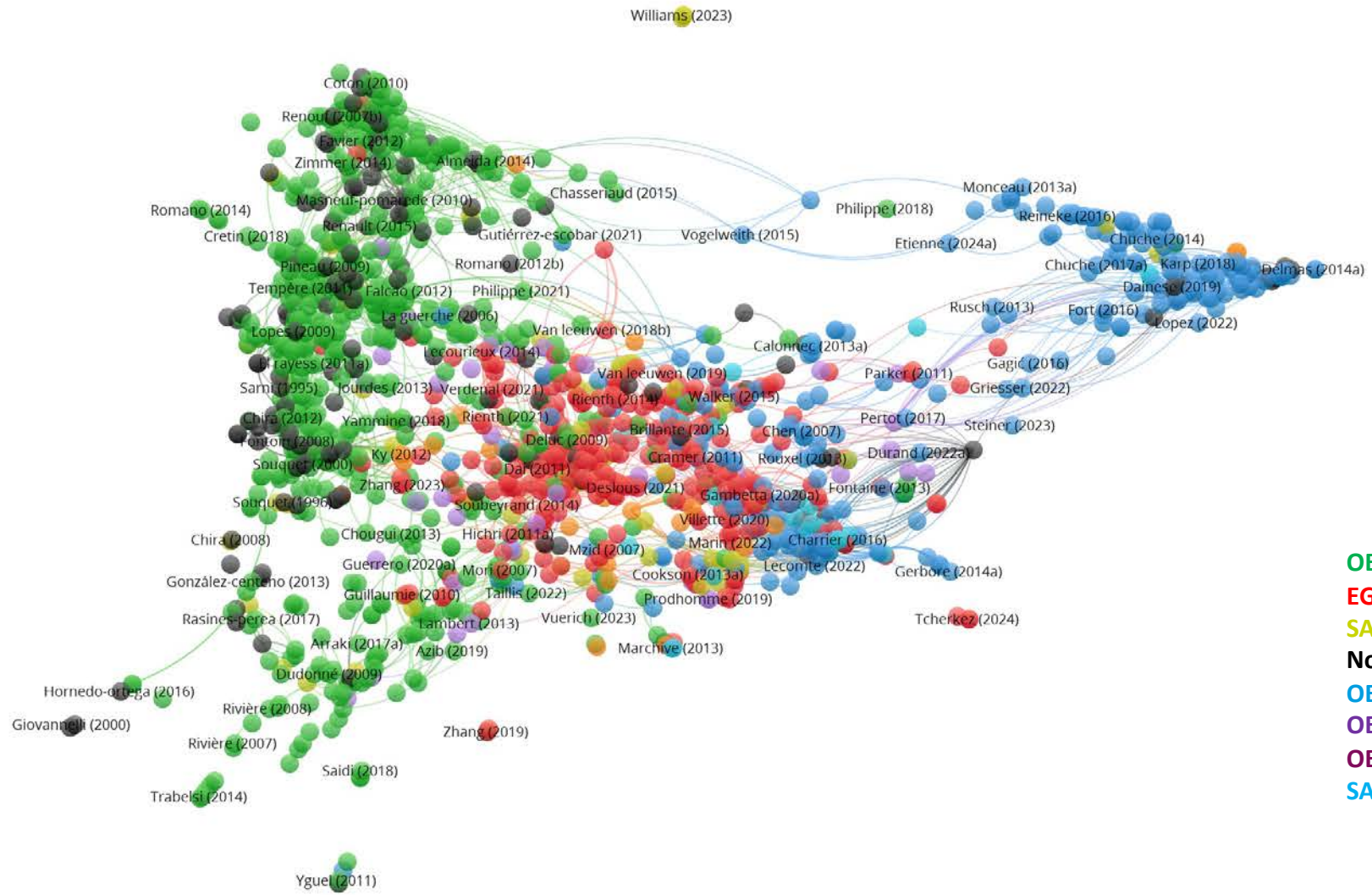
VOSviewer

Map des articles publiés avec l'affiliation à l'ISVV dans scopus. Les couleurs sont associées à un clustering (automatique)



J'ai extrait les keywords des articles de chaque cluster (en couleur) pour identifier les thèmes de recherche abordés. Ca illustre de façon quantitative, via les articles, la diversité des recherches menées à l'ISVV

Map des articles de l'ISVV, avec des couleurs associées aux UMRs



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OENO/EGFV
OENO/SAVE
SAVE/EGFV

VOSviewer

Exemples d’articles entre unités

SPECIAL ISSUE

No major impact of new grape varieties on Bordeaux wine typicity: expert assessments in blind and non-blind tastings

Article published in cooperation with the 13th IVAS 2024 conference

Marc Plantevin ✉ , Sophie Tempère, Cécile Thibon, Lucile Dijkstra, Julien Lecourt, Agnès Destrac-Irvine, Cornelis van Leeuwen

Vol. 59 No. 1 (2025): OENO One
Received : 13 November 2024; **Accepted :** 21 January 2025; **Published :** 10 February 2025
DOI: https://doi.org/10.20870/oeno-one.2025.59.1.8389

ARTICLE | AUTHORS | SUPPLEMENTARY DATA | METRICS

Abstract

Climate change induces major changes in wine typicity due to its impact on berry composition at harvest. This is of great concern for winegrowing regions historically renowned for their terroir and quality potential. Among different levers to adapt to climate change, the modification of grape varieties is considered to be very effective. However, this powerful tool can have repercussions for the protection of the region of origin’s wine typicity. In Bordeaux (France), a considerable research effort addresses the physiological traits of new varieties to thrive in a climate becoming increasingly dry and warm. Recently, a study investigating the typicity of 26 red varieties isolated five potential candidates (Fer Servadou, Duras, Manseng noir, Vinhão and Arinarnoa) sharing similar sensorial spaces compared to classical Bordeaux varieties. Varietal mix is strictly regulated by protected denomination of origin (PDO) rules, although these can change over time. If new varieties were to be accepted in the Bordeaux varietal mix, it would most likely be as secondary varieties accounting for a small proportion in the final Bordeaux blend. This study aimed to assess the impact of the five abovementioned varieties when incorporated into a classical Bordeaux blend (*i.e.*, Cabernet-Sauvignon, Merlot, Cabernet franc and Petit Verdot), at a proportion of 10 % and 30 % respectively. Two sensory analysis tests were conducted within a two-month period. The first one, which included 37 professional judges, showed that Bordeaux wine typicity barely changed when these varieties were introduced at 10 % or 30 %, except for Vinhão that underwent a slight typicity decrease. The second sensory analysis test was conducted by 20 highly professional judges with an exceptional degree of expertise (> 15 years of experience), especially in blending. Assessing the wines through both blind and non-blind tastings (indication of the varieties present in the blend), the importance of the information on the typicity judgment was assessed. No significant differences were recorded between non-blind and blind tastings, showing that the perceptual judgement of the highly-experienced professionals was not influenced by the introduction of the new varieties to the classical blend. By means of ranking tests, this sensory analysis also showed that the Bordeaux reference blend was the most typical of the wines. Duras and Arinarnoa at 10 or 30 % had a non-significant effect on the blend’s typicity, while a significant decrease of typicity was observed when Fer Servadou (at 10 % or 30 %), Manseng noir (at 30 %) or Vinhão (at 30 %) were introduced to the Bordeaux reference blend. This shift of typicity only occurs, however, on a tight continuum of less to more typical wines.

Horticulture Research

Horticulture Research, 2022, 9: uhac019
https://doi.org/10.1093/hr/uhac019

Review Article

Grapevine rootstock and soil microbiome interactions: Keys for a resilient viticulture

Romain Darriaut[1], Vincent Lailheugue[1], Isabelle Masneuf-Pomarède[2,3], Elisa Marguerit[1], Guilherme Martins[2,3], Stéphane Compant[4], Patricia Ballestra[2], Steven Upton[3], Nathalie Ollat[1] and Virginie Lauvergeat[1,*]

[1]EGFV, Univ. Bordeaux, Bordeaux Sciences Agro, INRAE, ISVV, F-33882, Villenave d’Ornon, France
[2]Université de Bordeaux, UMR Oenologie 1366, INRAE, Bordeaux INP, Bordeaux Sciences Agro, ISVV, Villenave d’Ornon, France
[3]Bordeaux Sciences Agro, 33170 Gradignan, France
[4]AIT Austrian Institute of Technology, Center for Health and Bioresources, Bioresources Unit, Konrad Lorenz Straße 24, Tulln, A-3430, Austria
*Corresponding author. E-mail: virginie.lauvergeat@inrae.fr

Abstract

Soil microbiota has increasingly been shown to play an integral role in viticulture resilience. The emergence of new metagenomic and culturomic technologies has led to significant advances in the study of microbial biodiversity. In the agricultural sector, soil and plant microbiomes have been found to significantly improve resistance to environmental stressors and diseases, as well as influencing crop yields and fruit quality thus improving sustainability under shifting environments. Grapevines are usually cultivated as a scion grafted on rootstocks, which are selected according to pedoclimatic conditions and cultural practices, known as terroir. The rootstock connects the surrounding soil to the vine’s aerial part and impacts scion growth and berry quality. Understanding rootstock and soil microbiome dynamics is a relevant and important field of study, which may be critical to improve viticulture sustainability and resilience. This review aims to highlight the relationship between grapevine roots and telluric microbiota diversity and activity. In addition, this review explores the concept of core microbiome regarding potential applications of soil microbiome engineering with the goal of enhancing grapevine adaptation to biotic and abiotic stress.

Introduction

Omics technologies have deepened our knowledge and understanding of telluric and ecosystemic processes; these developments underscore the importance of soil microbiome to plant health. The microbiome has recently been redefined as the microbiota and its theater of activity which combine microbial structural elements such as proteins, peptides, lipids, nucleic acids, polysaccharides, and microbial metabolites as signaling molecules, toxins, (in)organic molecules, and the environmental conditions [1]. Currently, the primary methods used to explore the taxonomic and functional soil microbiome diversity utilize plating methods and computed metagenomics which respectively rely on media composition and high-throughput sequencing [2]. Through the use of these techniques, it has been suggested that plant-associated microorganisms are recruited from the soil microbiota, thus serving as the microorganisms’ reservoir of rich microbial diversity [3].

In viticulture, the soil microbiome is now considered as a terroir component that could influence grape berry composition [4]. Studying the microbiome in vineyards, especially fungi and bacteria, is an emerging field of science as it holds the potential to improve grapevine adaptation to climate change and prevention of pathogenic infection. Thus, the study of vineyard microorganisms holds tremendous potential for improving vine resilience and helping vineyards better face increasing environmental stress.

The composition of the soil microbiota, and therefore its related biological activity, is dependent on many factors (*e.g.* physicochemical characteristics of the soil, plant species and cultivars, climatic conditions, cultural practices …) [5, 6]. Regardless of the microbiota already present in the soil, the main drivers of the composition of the microbial community associated with the root system (epiphytic and endophytic) are the primary and secondary metabolites exudated by the roots [7]. The composition of the exudates vary depending on environmental factors, as well as plant species and cultivars [8, 9], which collectively shape the root microbiome.

Cultivated grapevines are typically grafted plants composed of a scion (*Vitis vinifera* L.), which produces grape berries, and a rootstock (*Vitis* spp., tolerant to phylloxera aphids), which is selected considering pedoclimatic conditions. Grafting is a practice widely used to improve resistance to environmental stresses, yield and quality of the harvested product [10]. The rootstock works as an

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Exemples d'articles entre unités

Contents lists available at ScienceDirect

Plant Stress

journal homepage: www.sciencedirect.com/journal/plant-stress

Deciphering heat-enhanced resistance of grapevine berries to *Botrytis cinerea* highlights differential cuticular and secondary metabolite accumulations between Merlot and Cabernet Sauvignon

Erwan Chavonet[a], Cathleen Mirande-Ney[b], Sarah Bernardo[a], Clément Guinand[a], Ghislain Delestre[c], Xi Zhan[d], Josep Valls Fonayet[e,f], Sylvain Prigent[b,f], Pierre Van Delft[a,f], Stéphanie Pascal[a], Jérôme Joubès[a], David Lecourieux[d,*], Marc Fermaud[c,*], Frédéric Domergue[a,*]

[a] Univ. Bordeaux, CNRS, LBM, UMR 5200, F-33140 Villenave d'Ornon, France
[b] Univ. Bordeaux, INRAE, BFP, UMR 132, F-33140 Villenave d'Ornon, France
[c] INRAE, Bordeaux Sciences Agro, ISVV, SAVE, UMR 1065, F-33882 Villenave d'Ornon, France
[d] Univ. Bordeaux, Bordeaux Sciences Agro, INRAE, ISVV, EGFV, UMR 1287, F-33882 Villenave d'Ornon, France
[e] Univ. Bordeaux, Bordeaux INP, INRAE, OENO, UMR 1366, ISVV, F-33140 Villenave d'Ornon, France
[f] Bordeaux Metabolome, MetaboHUB, F-33140 Villenave-d'Ornon, France

Exemple co-publications

ARTICLE INFO

Keywords:
Gray mold
Heat stress
Ripening
Cuticle
Tannins
Stilbenes
Metabolomics

ABSTRACT

In the context of climate change, temperature is a key abiotic driver of bunch microclimate, which, in order to reduce *Botrytis cinerea* development, is often managed in vineyards *via* practices such as leaf removal. The heat-dependent mechanisms of pathogen resistance in grapevines nevertheless remain to be fully elucidated. In this study, the effect of heat stress (HS) applied specifically to green bunches on infections caused by *B. cinerea* on ripe berries inoculated 23 days later was assessed for two years in a greenhouse. Bunches of the Cabernet Sauvignon (CS) and Merlot (M) cultivars were heated 6 days 8 h daily with a 10 °C increased temperature. *In vitro* bio tests highlighted a significant heat-enhanced resistance only in CS berries, whereas a stable constitutive resistance characterized the M berries. Bunch veraison and total sugar content were not affected by HS, rejecting its effect on maturation dynamics. Therefore, berry preformed barriers at the time of inoculation, which can hinder fungal colonization, were investigated. While HS had nearly no effect on waxes, it significantly affected the cutin content in both varieties, and more significantly its composition in CS. Similarly, the antifungal skin condensed tannins overaccumulated following HS in both cultivars, and their basal level was greater in CS than in M. Otherwise, M accumulated more stilbene and flavonoid compounds, which may have contributed to the observed varietal resistance. Finally, untargeted metabolomic data revealed a range of compounds modulated by HS in CS as potential candidates involved in resistance.

Introduction

The necrotrophic cosmopolite fungus *Botrytis cinerea* is responsible for gray mold disease in grapevine (*Vitis vinifera* L.) bunches, and uncontrolled outbreaks lead to severe yield losses (Rahman et al., 2024). The onset of gray mold disease occurs on bunches after veraison (Elmer and Michailides, 2007), with symptoms subsequently increasing with fruit ripening (Deytieux-Belleau et al., 2009; Kretschmer et al., 2007). Early infection of floral tissues by *B. cinerea* are known as a major determinant of gray mold incidence and severity in grapevine bunches notably because the floral organs are highly susceptible and can serve as entry points for quiescent infections (Elmer and Michailides, 2007; Viret et al., 2004). Furthermore, the efficacy of fungicidal and/or biological treatments applied during full-bloom highlights the importance of this early stage (Calvo-Garrido et al., 2014; Fedele et al., 2020; Wang et al., 2023). Alternatively, infection may also accur directly by conidia or hyphae deposition on the fruit surface after veraison stage (Elmer and Michailides, 2007). Once the skin has been crossed, the underlying

* Corresponding authors.

Rubio et al. BMC Plant Biology (2020) 20:213
https://doi.org/10.1186/s12870-020-2310-0

BMC Plant Biology

RESEARCH ARTICLE Open Access

Characterization of genetic determinants of the resistance to phylloxera, *Daktulosphaira vitifoliae,* and the dagger nematode *Xiphinema index* from muscadine background

Bernadette Rubio[1,2], Guillaume Lalanne-Tisné[1,2], Roger Voisin[3], Jean-Pascal Tandonnet[1], Ulysse Portier[3], Cyril Van Ghelder[3], Maria Lafargue[1], Jean-Pierre Petit[1], Martine Donnart[1], Benjamin Joubard[4], Pierre-François Bert[1], Daciana Papura[4], Loïc Le Cunff[2], Nathalie Ollat[1*] and Daniel Esmenjaud[3]

Abstract

Background: Muscadine (*Muscadinia rotundifolia*) is known as a resistance source to many pests and diseases in grapevine. The genetics of its resistance to two major grapevine pests, the phylloxera *D. vitifoliae* and the dagger nematode *X. index*, vector of the *Grapevine fanleaf virus* (GFLV), was investigated in a backcross progeny between the F1 resistant hybrid material VRH8771 (*Vitis-Muscadinia*) derived from the muscadine R source 'NC184–4' and *V. vinifera* cv. 'Cabernet-Sauvignon' (CS).

Results: In this pseudo-testcross, parental maps were constructed using simple-sequence repeats markers and single nucleotide polymorphism markers from a GBS approach. For the VRH8771 map, 2271 SNP and 135 SSR markers were assembled, resulting in 19 linkage groups (LG) and an average distance between markers of 0.98 cM. Phylloxera resistance was assessed by monitoring root nodosity number in an *in planta* experiment and larval development in a root in vitro assay. Nematode resistance was studied using 10–12 month long tests for the selection of durable resistance and rating criteria based on nematode reproduction factor and gall index. A major QTL for phylloxera larval development, explaining more than 70% of the total variance and co-localizing with a QTL for nodosity number, was identified on LG 7 and designated *RDV6*. Additional QTLs were detected on LG 3 (*RDV7*) and LG 10 (*RDV8*), depending on the *in planta* or in vitro experiments, suggesting that various loci may influence or modulate nodosity formation and larval development. Using a Bulked Segregant Analysis approach and a proportion test, markers clustered in three regions on LG 9, LG 10 and LG 18 were shown to be associated to the nematode resistant phenotype. QTL analysis confirmed the results and QTLs were thus designated respectively *XiR2, XiR3 and XiR4*, although a LOD-score below the significant threshold value was obtained for the QTL on LG 18.

(Continued on next page)

* Correspondence: nathalie.ollat@inrae.fr
In memory of Dr Alain Bouquet
[1]INRAE, UMR EGFV, 33883 Villenave d'Ornon, France
Full list of author information is available at the end of the article

Exemples d'articles entre unités

ELSEVIER

Food Chemistry
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Oenological tannins to prevent *Botrytis cinerea* damage in grapes and musts: Kinetics and electrophoresis characterization of laccase

Adeline Vignault [a b c d], Jordi Gombau [c], Michael Jourdes [a b], Virginie Moine [d], Joan Miquel Canals [c], Marc Fermaud [e], Jean Roudet [e], Fernando Zamora [c], Pierre-Louis Teissedre [a b]

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Highlights

- Enzymatic parameters of laccase of *B. cinerea* in presence of oenological tannins were determined.
- Electrophoretic characterization of laccase of *B. cinerea* in presence of oenological tannin was investigated.
- Bentonite, contrary to oenological tannins, did not reduce laccase activity.
- Gallotannin, skin and seed tannins were the greatest to reduce laccase activity.
- Oenological tannins seem to be great tool to prevent laccase effects and reduce use of SO_2.

AGRICULTURAL AND ENVIRONMENTAL CHEMISTRY | February 2, 2021

Three Types of Elicitors Induce Grapevine Resistance against Downy Mildew via Common and Specific Immune Responses

Aleksandra Burdziej, Anthony Bellée, Enora Bodin, Josep Valls Fonayet, Noël Magnin, Anna Szakiel, Tristan Richard, Stéphanie Cluzet*, and Marie-France Corio-Costet*

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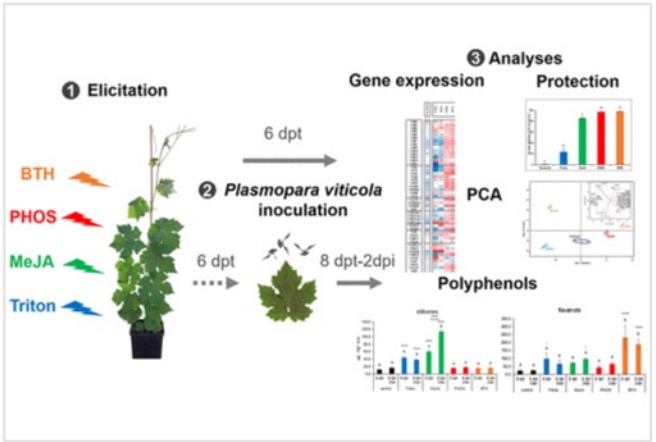
Noël Magnin

INRAE, UMR Santé et Agroécologie du Vignoble (1065), ISVV, Labex Cote, CS 20032, 33882 Villenave d'Ornon, France

More by Noël Magnin

Abstract

Three recognized plant defense stimulators (PDS), methyl jasmonate (MeJA), benzothiadiazole (BTH) and phosphonates (PHOS), were sprayed on grapevine *Vitis vinifera* cuttings and conferred resistance to the biotrophic pathogen *Plasmopara viticola*. The effects on molecular defense-related genes and polyphenol content (stilbenes and flavanols) were revealed at 6 and 8 days post-elicitation. The transcript accumulation was consistent with the signaling pathway specific to the elicitor, salicylic acid for BTH, and jasmonic acid for MeJA, with some cross-talks. PHOS tended to modulate the defense responses like BTH. Moreover, in response to a downy mildew inoculation, the leaves pre-treated with PHOS and BTH overproduced pterostilbene, and after MeJA treatment, piceids and ε-viniferin, compared to uninoculated elicitor-treated leaves. These results provide evidence of the different modes of action of PDS and their role in sustainable viticulture.



Exemples d'articles entre unités

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Article

Identifying early metabolite markers of successful graft union formation in grapevine

Grégoire Loupit[1,*], Josep Valls Fonayet[2,3], Sylvain Prigent[2,4], Duyen Prodhomme[1], Anne-Sophie Spilmont[5], Ghislaine Hilbert[1], Céline Franc[3], Gilles De Revel[3], Tristan Richard[2,3], Nathalie Ollat[1] and Sarah Jane Cookson[1]

[1]EGFV, University Bordeaux, Bordeaux Sciences Agro, INRAE, ISVV, F-33882 Villenave d'Ornon, France
[2]Bordeaux Metabolome Facility, MetaboHUB, PHENOME-EMPHASIS, Centre INRAE de Nouvelle Aquitaine - Bordeaux, av Edouard Bourlaux, 33140 Villenave d'Ornon, France
[3]University Bordeaux, Unité de recherche Œnologie, EA 4577, USC 1366 INRAE, ISVV, F33882 Villenave d'Ornon, France
[4]INRAE, University Bordeaux, UMR BFP, 33882 Villenave d'Ornon, France
[5]Institut Français de la Vigne et du Vin, Domaine de l'Espiguette, 30240 Le Grau-du-Roi, France
*Corresponding author. E-mail: gregoire.loupit@u-bordeaux.fr

Abstract

Grafting is an important horticultural technique used for many crop species. However, some scion/rootstock combinations are considered as incompatible due to poor graft union formation and subsequently high plant mortality. The early identification of graft incompatibility could allow the selection of non-viable plants before planting and would have a beneficial impact on research and development in the nursery sector. In general, visible phenotypes of grafted plants (size, root number, etc.) are poorly correlated with grafting success, but some studies have suggested that some polyphenols could be used as markers of graft incompatibility several months or years after grafting. However, much of the previous studies into metabolite markers of grafting success have not included all the controls necessary to unequivocally validate the markers proposed. In this study, we quantified 73 primary and secondary metabolites in nine hetero-grafts and six homo-grafted controls 33 days after grafting at the graft interface and in both the scion and rootstock woody tissues. Certain biomarker metabolites typical of a high stress status (such as proline, GABA and pallidol) were particularly accumulated at the graft interface of the incompatible scion/rootstock combination. We then used correlation analysis and generalized linear models to identify potential metabolite markers of grafting success measured one year after grafting. Here we present the first attempt to quantitatively predict graft compatibility and identify marker metabolites (especially asparagine, *trans*-resveratrol, *trans*-piceatannol and α-viniferin) 33 days after grafting, which was found to be particularly informative for homo-graft combinations.

Introduction

In horticulture, grafting is a common vegetative propagation technique, allowing us to combine two different genotypes together to generate one plant. The mechanisms involved in graft union formation are complex and include the formation of a callus and new vascular tissues between the two genotypes. However, despite many studies and use of grafting for millennia, the mechanisms underlying the cohabitation of the two genotypes of grafted plants are still poorly understood [1].

The commercial use of grafting depends upon the degree of graft compatibility, i.e. the ability of the assembled scion/rootstock to form and sustain a successful graft union. Graft incompatibility is often characterized by anatomical irregularities at the graft interface, which induce mechanical weakness and subsequently death of plants. Graft incompatibility can occur soon after grafting, reducing grafting success in nurseries, or can appear several years after planting in the field (this delay may be only in the appearance of incompatibility symptoms that have been progressing, unobserved, since shortly after the grafting was performed). These incompatibilities can be due to the presence of a pathogen or to genetic distance, but poor grafting success can be also due to graft quality or climatic conditions during the growth [2]. The significant delay in the appearance of incompatibility symptoms renders the evaluation and transfer of new genotypes to industry time-consuming, expensive, and laborious.

In viticulture, after grafting, the grafts produced are planted in the nursery for one year, and then up-rooted and marketable grafts are selected. Many plants will not be considered marketable due to too insufficient root and/or shoot growth and/or problems with the development of callus at the graft interface; the proportion of marketable versus non-marketable plants gives an indication of grafting success. Graft incompatibility is relatively rare once grapevines have been planted in the vineyard, but of the 233.5 million plants grafted in France

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ELSEVIER

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Methyl salicylate, a grape and wine chemical marker and sensory contributor in wines elaborated from grapes affected or not by cryptogamic diseases

Xavier Poitou [a 1] ✉, Pascaline Redon [a] ✉, Alexandre Pons [a c] ✉, Emilie Bruez [a] ✉, Laurent Delière [b] ✉, Axel Marchal [a] ✉, Céline Cholet [a] ✉, Laurence Geny-Denis [a] ✉, Philippe Darriet [a] ✉

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Highligths

- MeSA can be assayed in wines at concentrations over its olfactory detection threshold.
- MeSA is extracted during alcoholic fermentation from *V.vinifera* grape skins and stems.
- MeSA in wines can be related to grapevine alteration level by several pathogens.

Liste de partenaires issue de l'analyse des affiliations [#1734 articles SCOPUS]

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