How to reason the grape harvest dates and the cultural practices based on the desired aromatic profile of wines ?

Как определить даты сбора винограда на основе желаемого ароматического профиля вин?

Alain DELOIRE and Elena Kraeva-Deloire

Version du 25 Mai 2023

In the context of climate change, physiological questions revolve around the role and limitations of abiotic factors in the functioning of vine-grape

- Light
- Temperature
- Water (vine water status x soil water content x root system)

Deloire A. & Pellegrino A., 2022

Абиотические факторы значительно влияют на физиологию винограда в контексте изменения климата

- Солнечный свет
- Температура
- Вода (водный статус растения x содержание воды в почве x корневая система)

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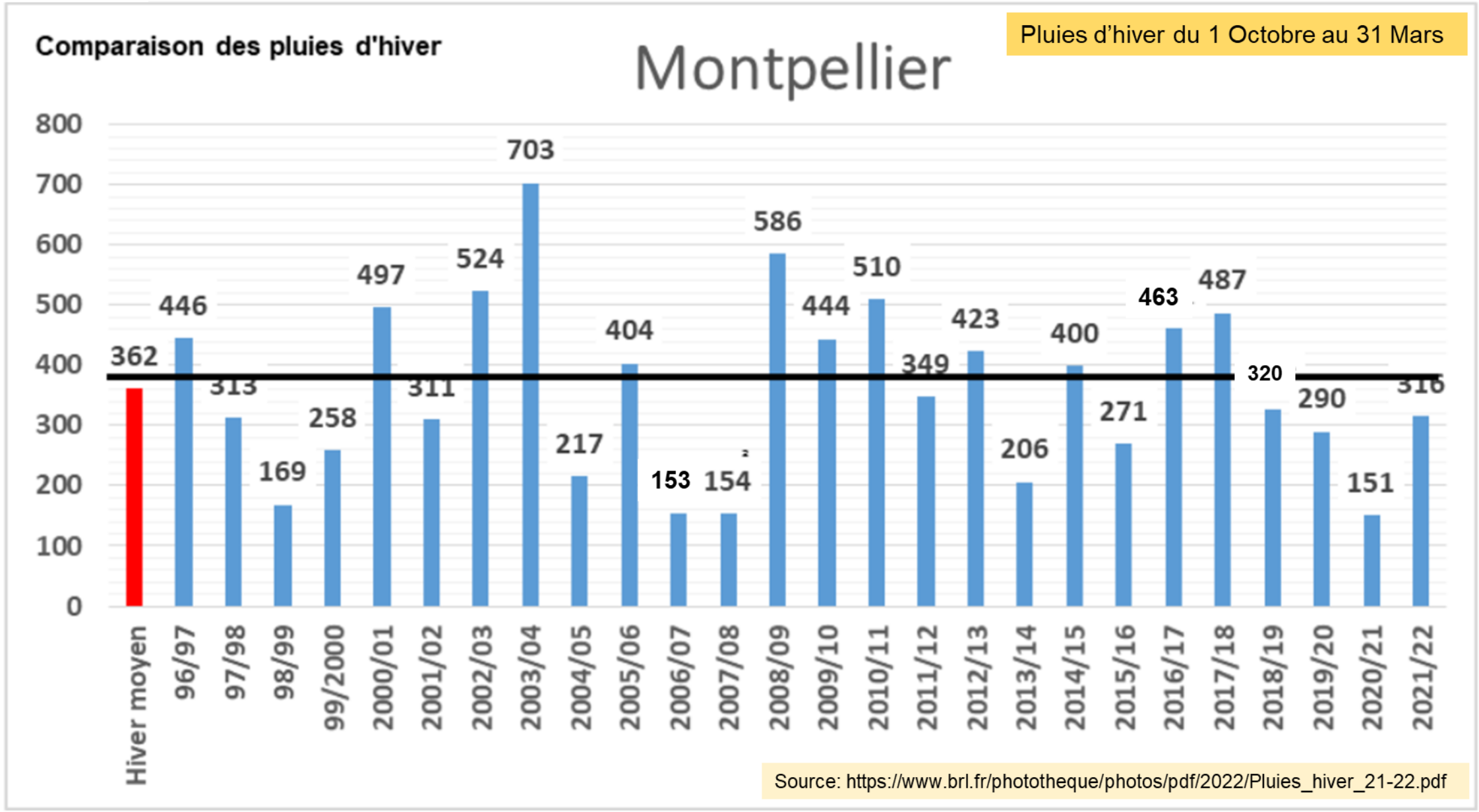
Winter rainfall occurs from October 1st to March 31st.



Source: https://www.brl.fr/phototheque/photos/pdf/2022/Pluies_hiver_21-22.pdf

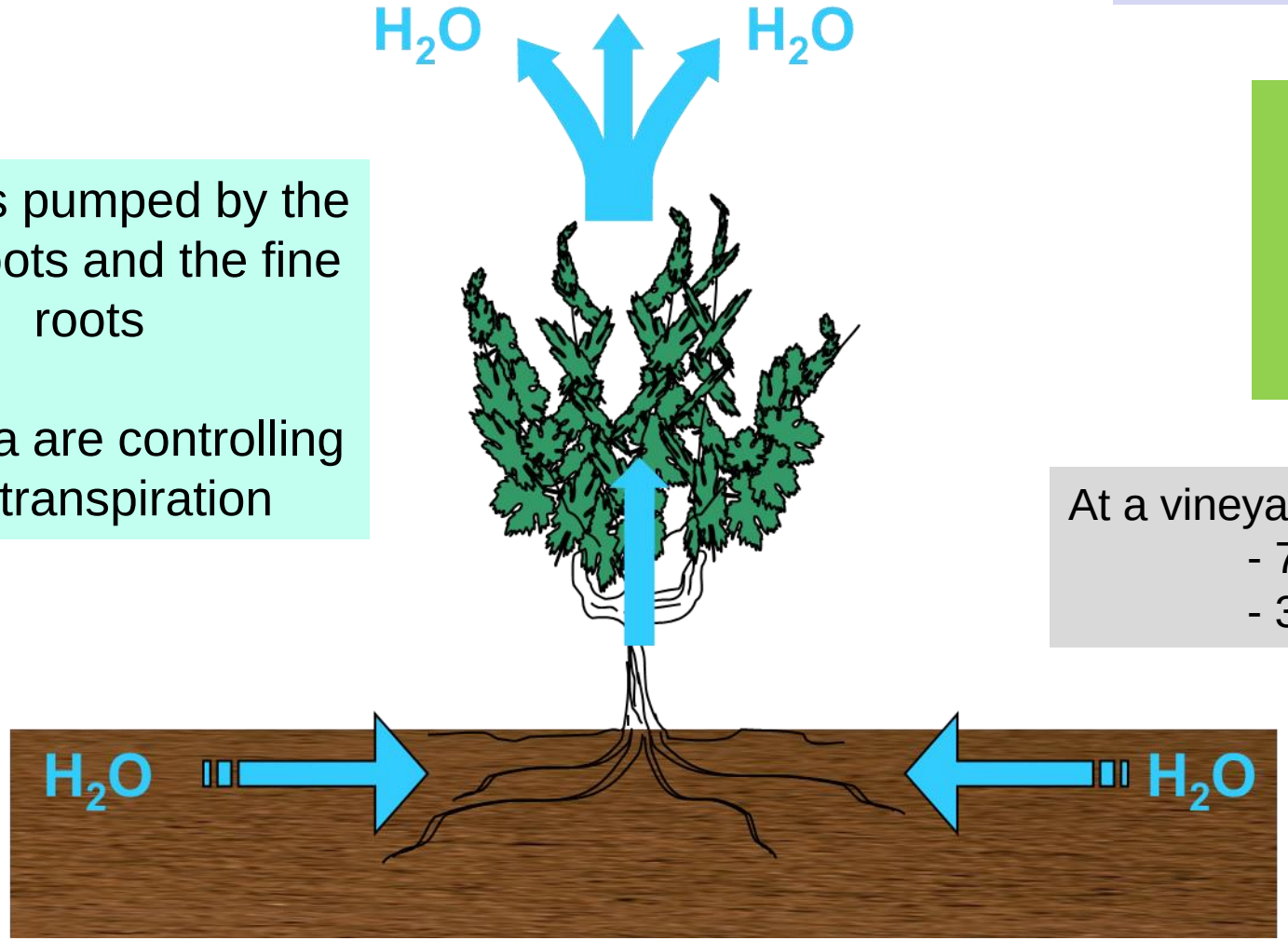

Grapevine and water
A love story !
Виноград и вода -
История любви!

98% of the water is transpired by a vine …

Water efficiency is the ability of a plant to fixe the CO2 by using less water as possible

Water is pumped by the main roots and the fine roots

Stomata are controlling leaf transpiration



"250 – 350 litres of water is needed in a vineyard to produce one litre of must… and this applies for all Vitis Vinifera L.

At a vineyard level (approximate):

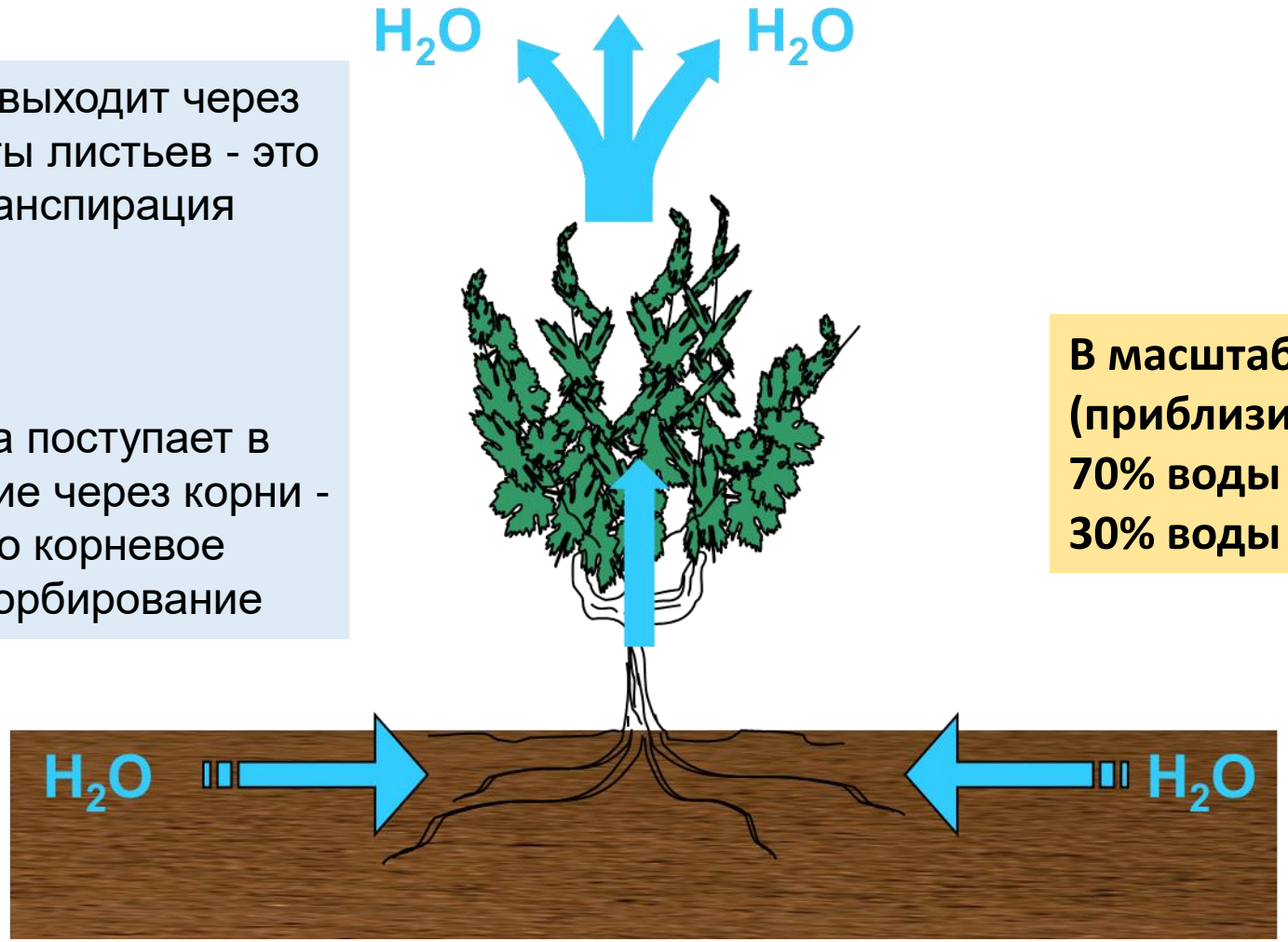
- 70% of water is used for transpiration
- 30% of water is used for evaporation

Pellegrino A., Deloire A., 2021

Виноград испаряет 98 % воды, поступающей из почвы

Вода выходит через стоматы листьев - это транспирация

Вода поступает в растение через корни - это корневое адсорбирование



Для производства одного литра сусла на винограднике требуется от 250 до 350 литров воды, независимо от сорта винограда.

В масштабах виноградника (приблизительно):
70% воды испаряется через листья
30% воды испаряется через почву

Pellegrino A., Deloire A., 2021

Water is needed at all phenological stages for vine functioning…

Water & nitrogen supply are major soil factors impacting yield components

winter | spring | summer | autumn







dormancy | **budbreak** | **flowering - nouaison** | **véraison** | **ripening - harvest** | **post harvest**

To fill the soil water content before bud break

To ensure water and minerals uptake by roots

To avoid water and nitrogen shortage

No water constraint

Moderate water restriction:
- To control vegetative growth
- To control berry growth/size
- To avoid inhibition of berry compound accumulation

To ensure vine carbohydrates and Nstorage avoiding water and N shortage

A. Deloire, A. Pellegrino, 2018

Вода необходима на всех стадиях фенологического развития винограда…

Вода и азот являются основными факторами почвы, влияющими на урожай

зима | весна | лето | осень







покой

появление листьев

цветение - завязывание ягод

начало созревания

зрелость - сбор урожая

осеннее опадание листьев

Орошать почву перед раскрытием почек

обеспечить усвоение воды и минералов корнями

избежать нехватки воды и азота

Отсутствие ограничений на воду

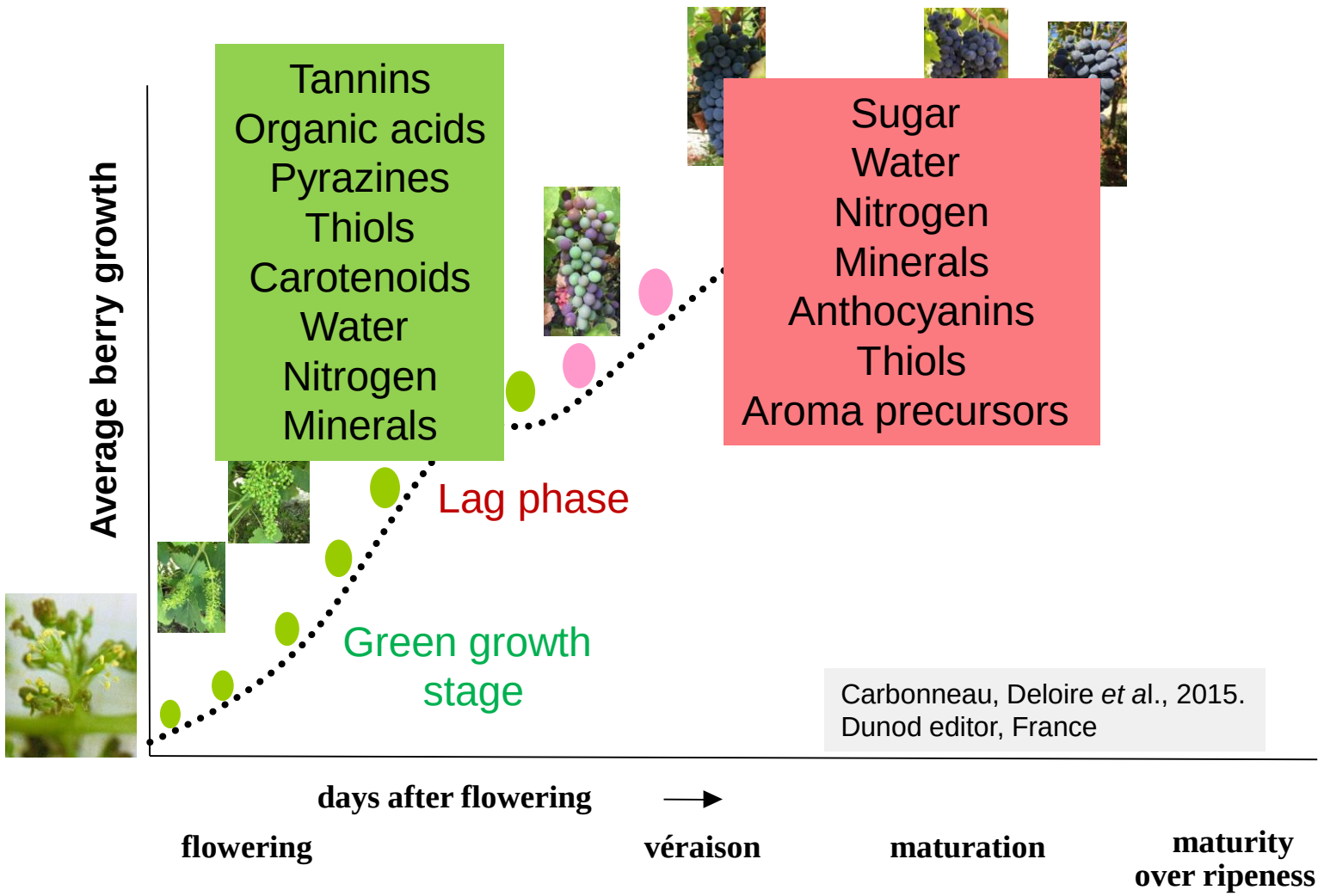
Умеренное ограничение воды:
- Для контроля вегетативного роста
- Для контроля роста/размера ягод
- Во избежание ингибирования биосинтеза

обеспечить накопление углеводов в растении, избегая нехватки воды и азота

A. Deloire, A. Pellegrino, 2018


Let's talk about grape development
(with the fruit of the vine being the berry)
Давайте поговорим о развитии и созревании ягод винограда

The three stages of berry development



Carbonneau, Deloire *et al*., 2015. Dunod editor, France

Три этапа развития и созревания ягод

Танины
Органические кислоты
Пиразины
Тиолы
Каротиноиды
Вода
Азот
Минералы

Сахар
Вода
Азот
Минералы
Антоцианы
Тиолы
Ароматические прекурсоры
(предшественники)

Average berry growth

Lag phase

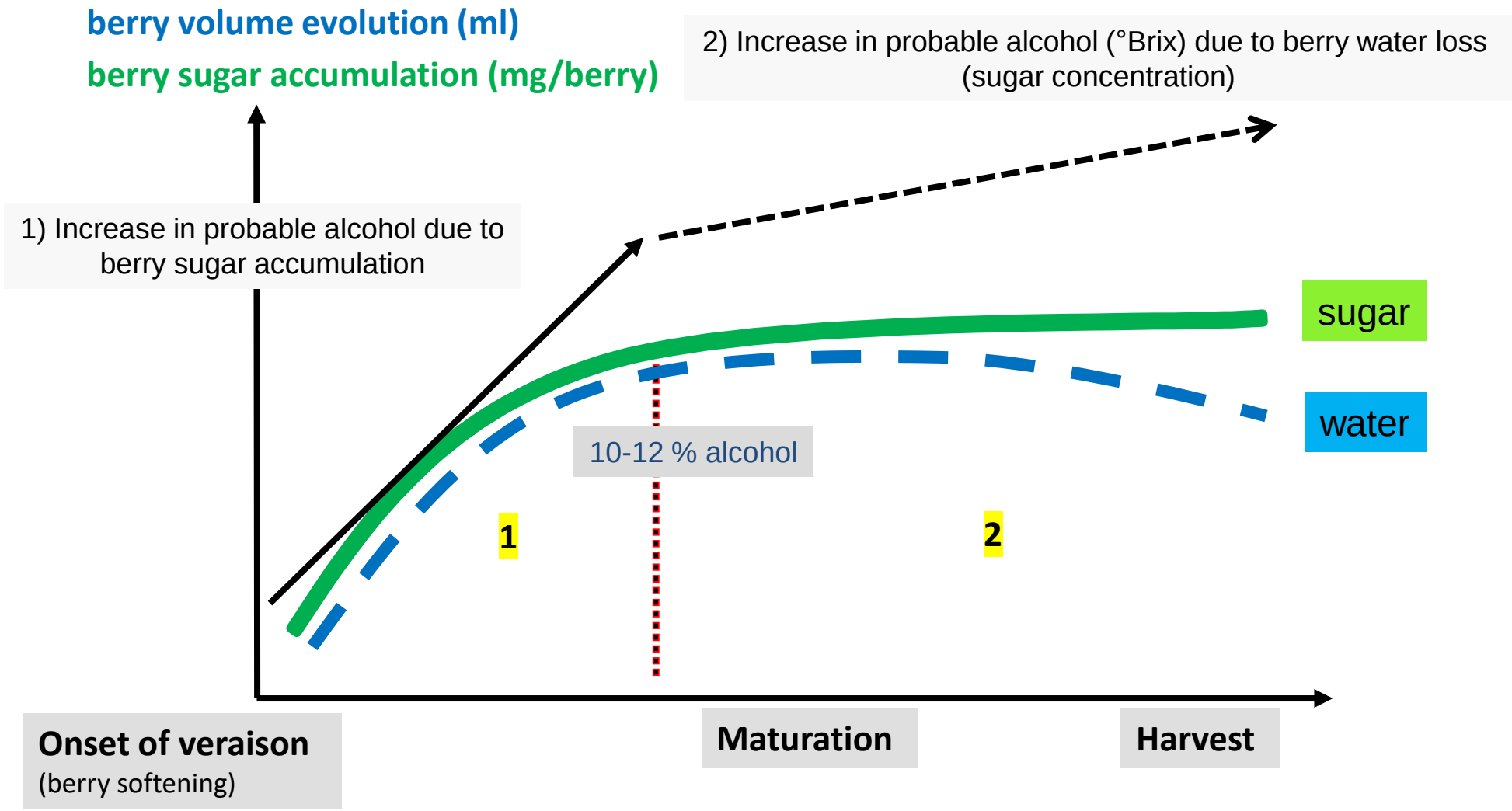
Green growth stage

Carbonneau, Deloire *et al*., 2015.
Dunod editor, France

days after flowering →

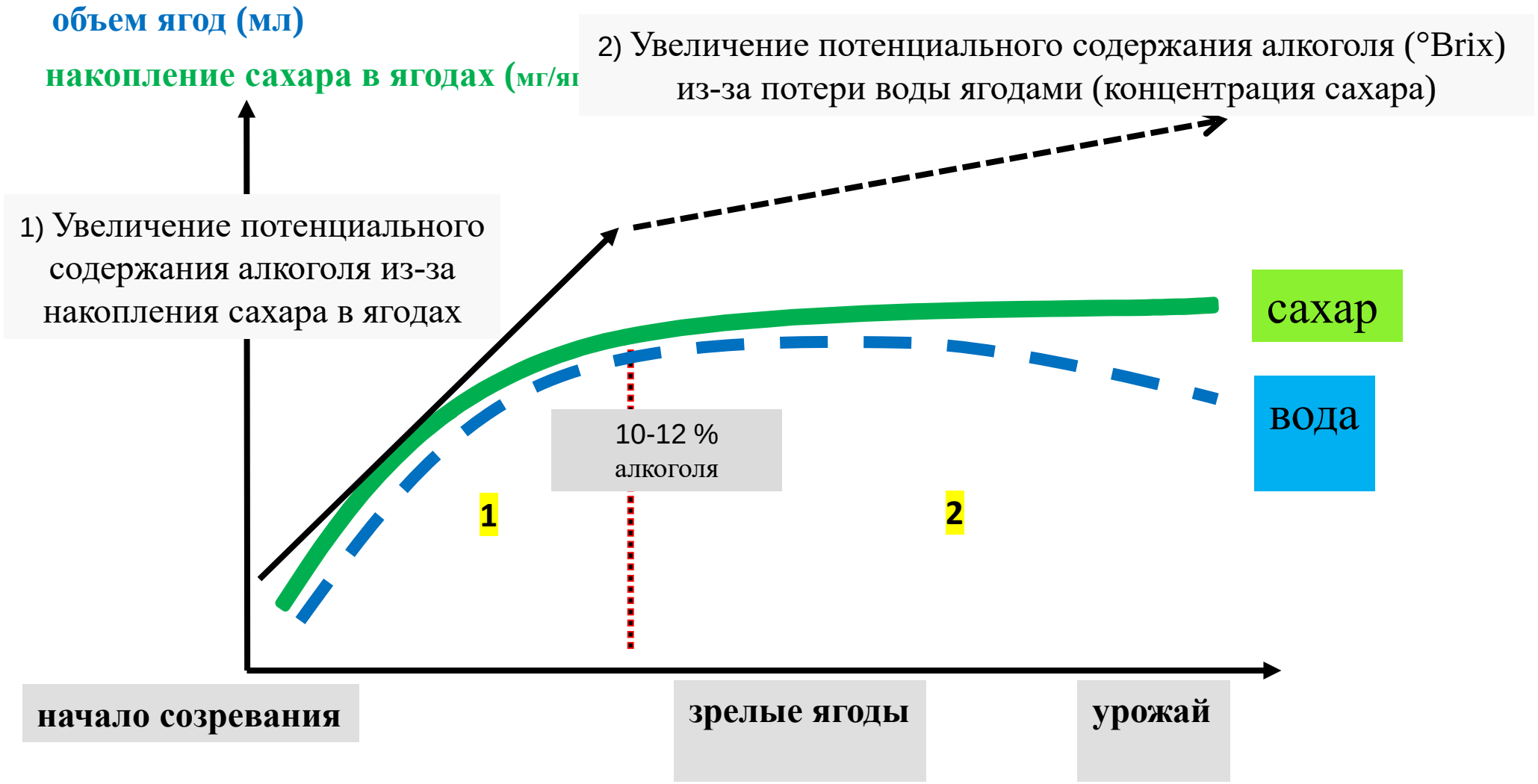
flowering | véraison | maturation | maturity over ripeness

Dynamic of berry sugar and water accumulation …



Katja Šuklje, Guillaume Antalick1, Campbell MEEKS, John W. Blackman, Alain Deloire, and Leigh M. Schmidtke, 2017. Optimising harvest date through use of an integrated grape compositional and sensory model: a proposed approach for a better understanding of ripening of autochthonous varieties, Acta Horticulturae · November 2017DOI: 10.17660/ActaHortic.2017.1188

Динамика накопления сахара и воды в ягодах…



Katja Šuklje, Guillaume Antalick1, Campbell MEEKS, John W. Blackman, Alain Deloire, and Leigh M. Schmidtke, 2017. Optimising harvest date through use of an integrated grape compositional and sensory model: a proposed approach for a better understanding of ripening of autochthonous varieties, Acta Horticulturae · November 2017DOI: 10.17660/ActaHortic.2017.1188

So the increase in alcohol content of wines is not due to the fact that there are more sugars in the berries, but rather to the water losses of the fruit after reaching the sugar loading plateau.

Итак, увеличение содержания алкоголя в винах не обусловлено тем, что в ягодах больше сахаров, а зависит от потерь воды плода после окончания фазы накопления сахаров

Received: 30 October 2020 | Accepted: 1st March 2021 | Published: 21 April 2021
DOI:10.20870/oeno-one.2021.55.2.4527

Performing sequential harvests based on berry sugar accumulation (mg/berry) to obtain specific wine sensory profiles

Guillaume Antalick[1,2]*, Katja Šuklje[1,3], John W. Blackman[1], Leigh M. Schmidtke[1] and Alain Deloire[1,4]

[1] National Wine and Grape Industry Centre, School of Agricultural and Wine Sciences Lock Bag 588, Wagga Wagga, New South Wales, Australia, 2678
[2] Wine Research Centre, Univerza v Novi Gorici, Vipavska 13, 5000 Nova Gorica, Slovenia
[3] Agricultural institute of Slovenia, department of Fruit growing, Viticulture and Oenology, Hacquetova 17, 1000 Ljubljana
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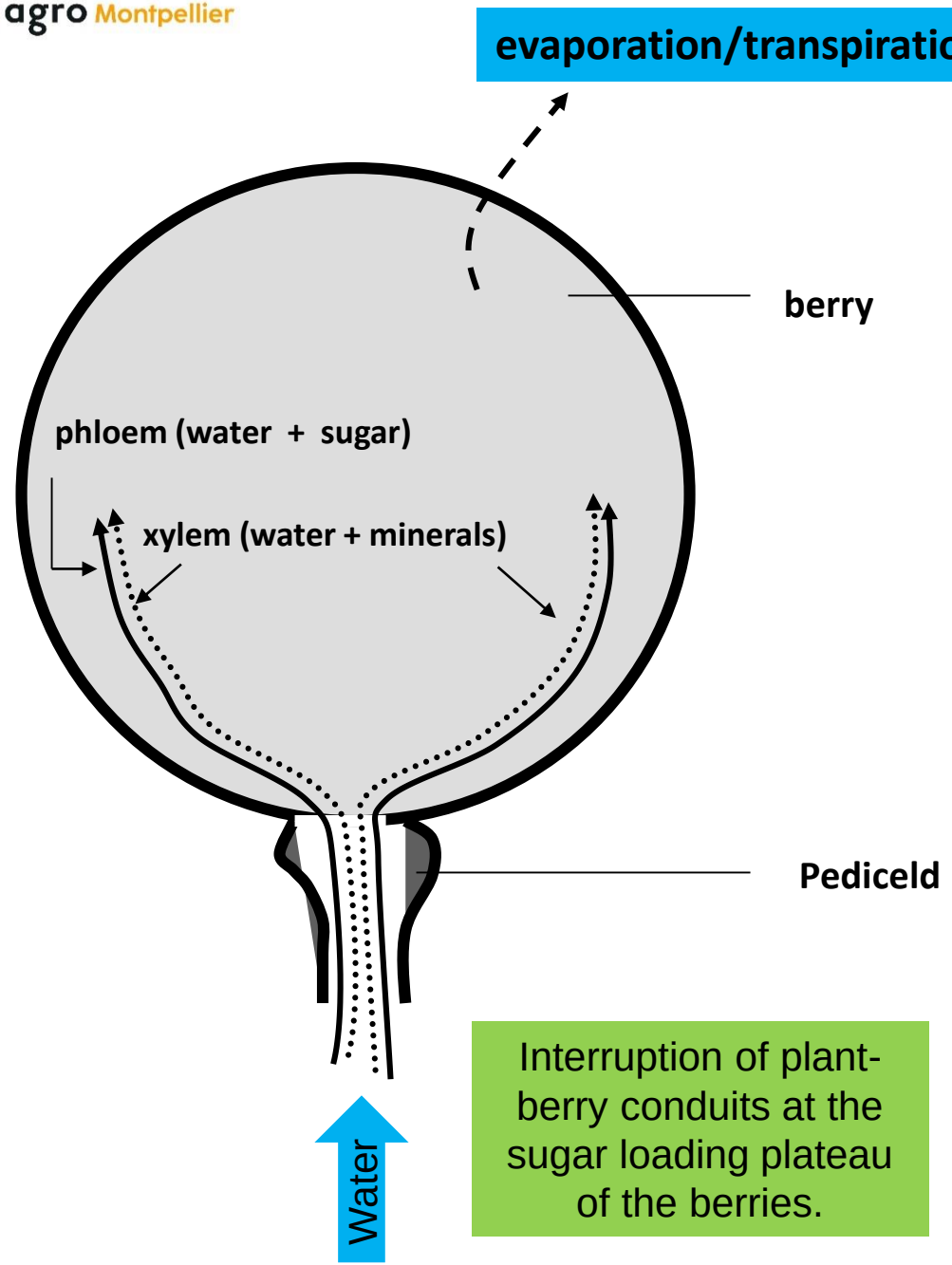
Received: 18 June 2020 | Accepted: 9 September 2020 | Published: 20 November 2020
DOI:10.20870/oeno-one.2020.54.4.3787

First quantitative assessment of growth, sugar accumulation and malate breakdown in a single ripening berry

Rezk Shahood [1,2], Laurent Torregrosa[1,3], Stefania Savoi[1], Charles Romieu[1,3]*

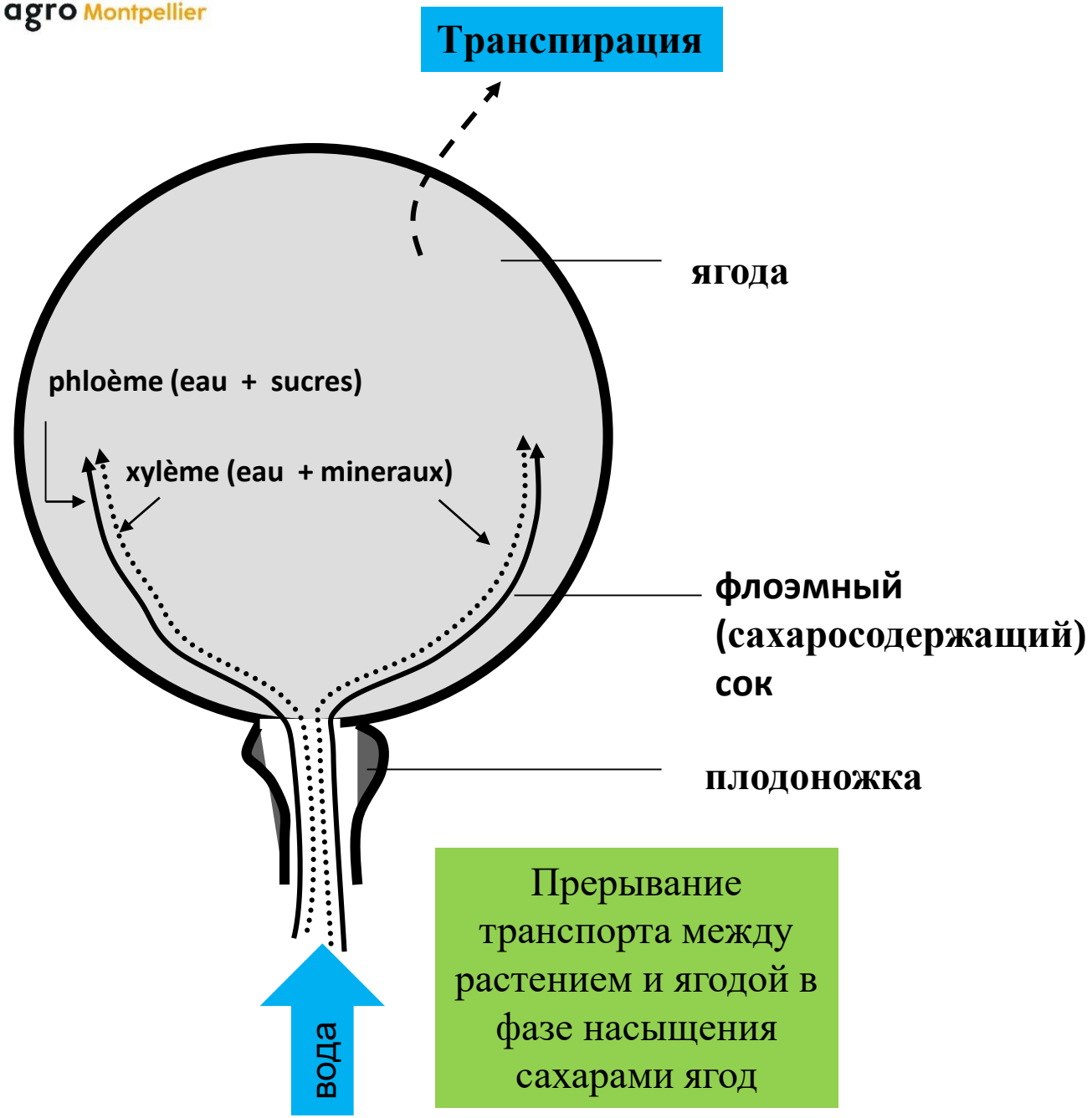
[1] AGAP, University of Montpellier, CIRAD, INRAe, Institut Agro, Montpellier, France
[2] General Commission for Scientific Agricultural Research, Lattakia, Syria
[3] GENOVIGNE, University of Montpelier, IFV, INRAe, Institut Agro, Montpellier, France

*corresponding author: charles.romieu@inrae.fr



Interruption of plant-berry conduits at the sugar loading plateau of the berries.

Deloire A., Rogiers S., Suklje K., Antalick G., Zeyu X., Pellegrino A., 2021. Grapevine berry shrivelling, water loss and cell death: an increasing challenge for growers in the context of climate change, https://ives-technicalreviews.eu/article/view/4615



Прерывание транспорта между растением и ягодой в фазе насыщения сахарами ягод

Deloire A., Rogiers S., Suklje K., Antalick G., Zeyu X., Pellegrino A., 2021. Grapevine berry shrivelling, water loss and cell death: an increasing challenge for growers in the context of climate change, https://ives-technicalreviews.eu/article/view/4615

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Article

pubs.acs.org/JAFC

Berry Shriveling Significantly Alters Shiraz (*Vitis vinifera* L.) Grape and Wine Chemical Composition

Katja Šuklje,*[,†,§] Xinyi Zhang,[†,§] Guillaume Antalick,[†] Andrew C. Clark,[†,‡] Alain Deloire,[†] and Leigh M. Schmidtke[†,‡]

[†]National Wine and Grape Industry Centre, Charles Sturt University, Locked Bag 588, Wagga Wagga, New South Wales 2678, Australia

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Supporting Information

ABSTRACT: Berry shriveling is an often reported occurrence in the Shiraz (*Vitis vinifera* L.) cultivar. This study investigated the effect of berry shriveling occurring in a high yielding (18.6 ± 1.6 kg/vine) Shiraz vineyard in relation to a temporal investigation of grape and wine composition using three harvest dates. Berry shriveling resulted in delayed total soluble solids and amino acid accumulation into the berry, however differences between treatments diminished or became smaller by the third harvest date. Similarly, ethyl esters of fatty acids and higher alcohol acetates were lower in wines from shriveled berries from the first two harvests; anthocyanins were reduced in wines from shriveled berries at all harvest dates, whereas terpenes were unaltered. Wines made from shriveled berries had higher γ-nonalactone and β-damascenone concentrations. This study provides novel information on the chemical alterations of grapes and wines made from grapes affected by shriveling.

KEYWORDS: *maturity, fermentation, wine aroma, ANOVA-PCA, vineyard*

So to follow the relevant grapevine physiological indicators as :

- Berry volume (fresh mass)
- Berry sugar accumulation
- Berry malic acid accumulation
- Berry anthocynins biosynthesis
- Berry nitrogen accumulation
- Vine water status…

www.vivelys.com

…is crucial to understand vine functioning (variety x environment) and to take the appropriate decisions in the vineyard and in the winery

Deloire A., 2023

Чтобы отслеживать и контролировать физиологические показатели винограда, такие как:

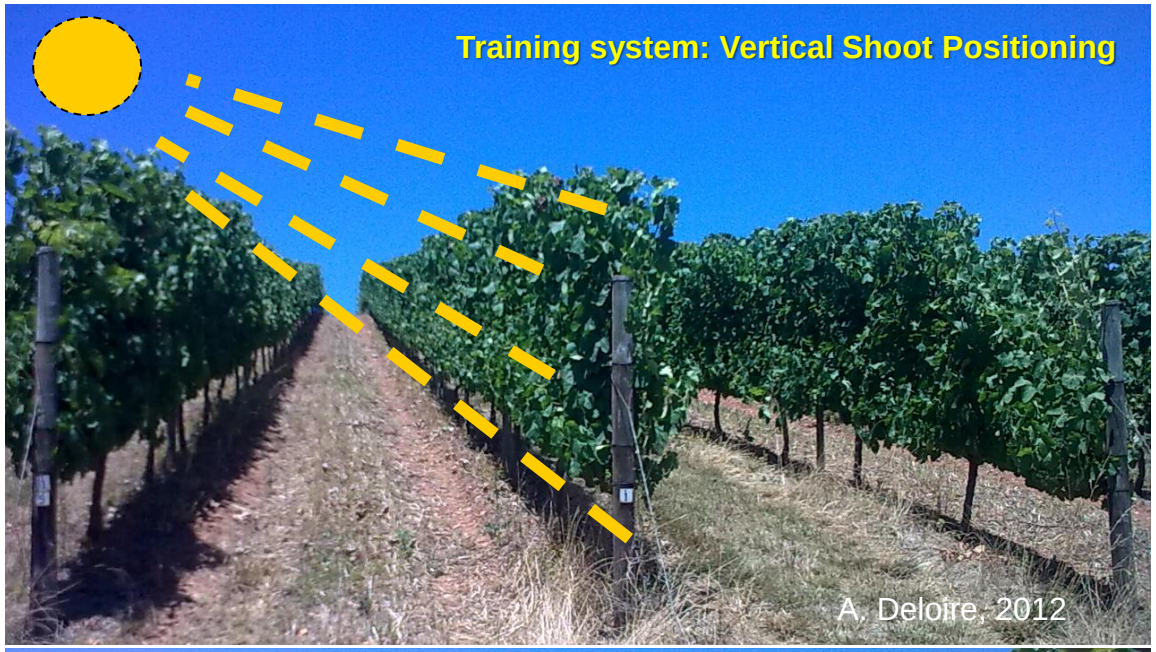
- Объем ягод
- Накопление сахара в ягодах
- Биосинтез антоцианов в ягодах
- Накопление азота в ягодах
- Водный потенциал растения...

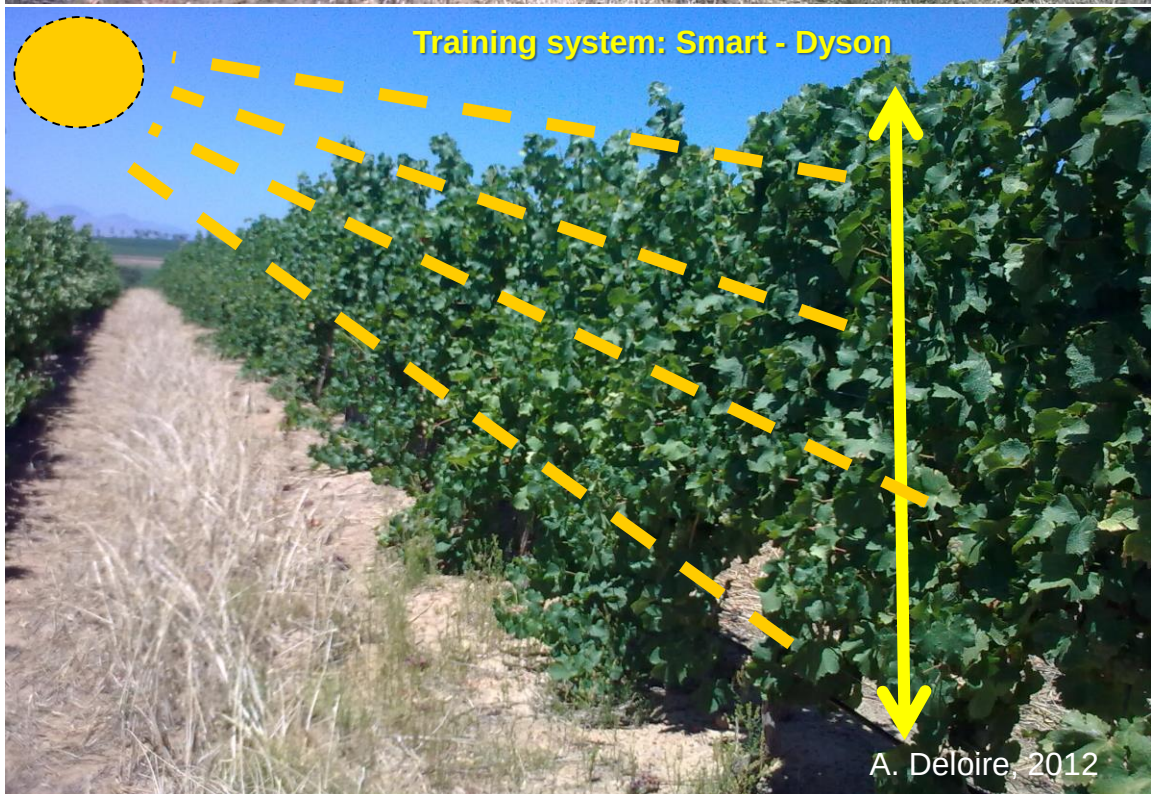
www.vivelys.com

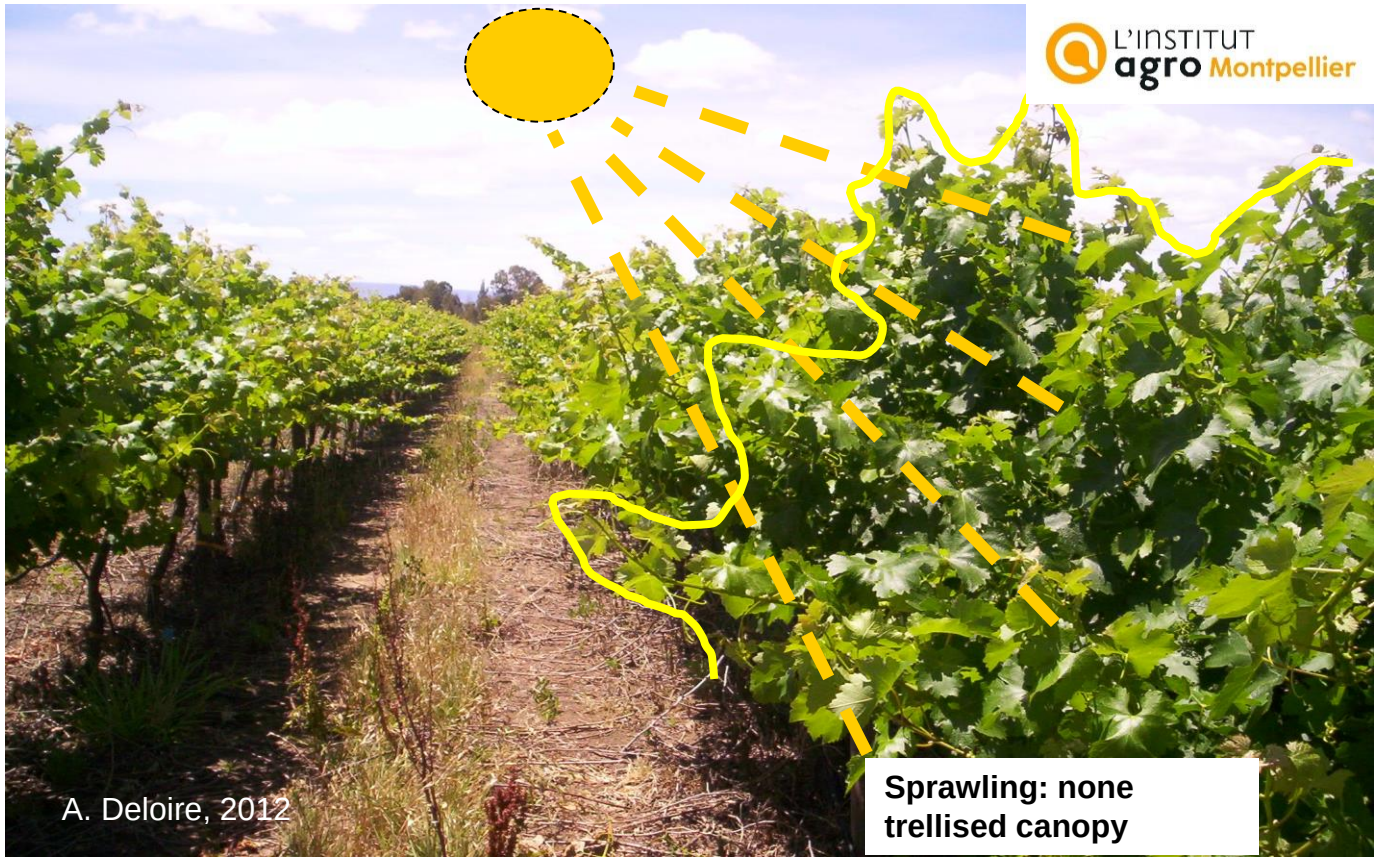
… крайне важно понимать функционирование растения (в зависимости от сорта и окружающей среды) и принимать соответствующие решения на винограднике и в винодельне.

Deloire A., 2023


The role of light
fiat lux et lux fuit
Роль солнечного света


Training system: Vertical Shoot Positioning
A. Deloire, 2012


Training system: Smart - Dyson
A. Deloire, 2012


L'INSTITUT agro Montpellier
A. Deloire, 2012
Sprawling: none trellised canopy


Gobelet « échalassé »
A. Deloire, 2012

Let’s share some results about the light effect
on Sauvignon blanc
berry composition
and wine aromatic profiles
(South Africa)

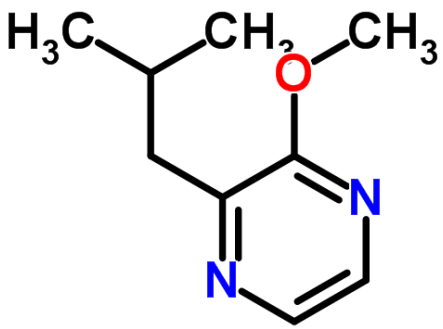
Поделимся некоторыми результатами о влиянии света на состав ягод Sauvignon Blanc и ароматический профиль вина (Южная Африка).

Methoxypyrazines

Метоксипиразины

- IBMP (3-isobutyl-2-methoxypyrazine)
- IPMP (3-isopropyl-2-methoxypyrazine)
- MPsB (2-methoxy-3-sec-butylpyrazine)

(Augustyn *et. al*., 1982)



- Sauvignon Blanc, Cabernet Sauvignon, Merlot, Cabernet franc, Carmenere

- 0.5-2 ng/L in water, synthetic wine and white wine; 10-16 ng/L in red wines (Sala *et al*, 2004)

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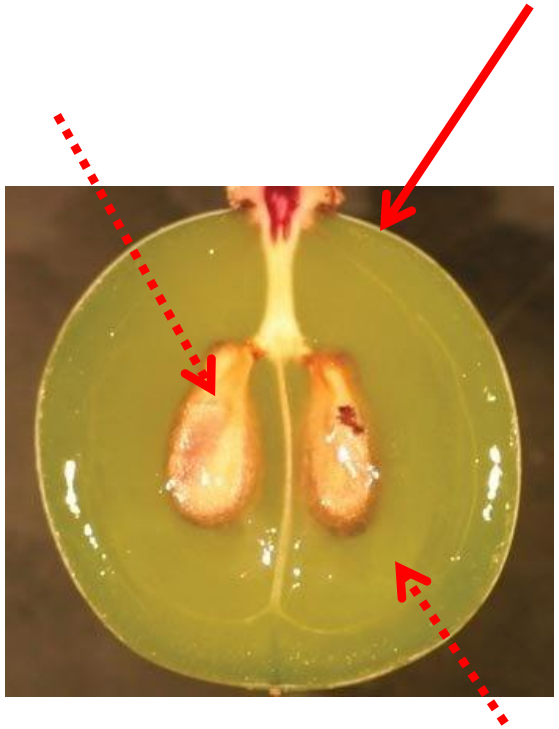
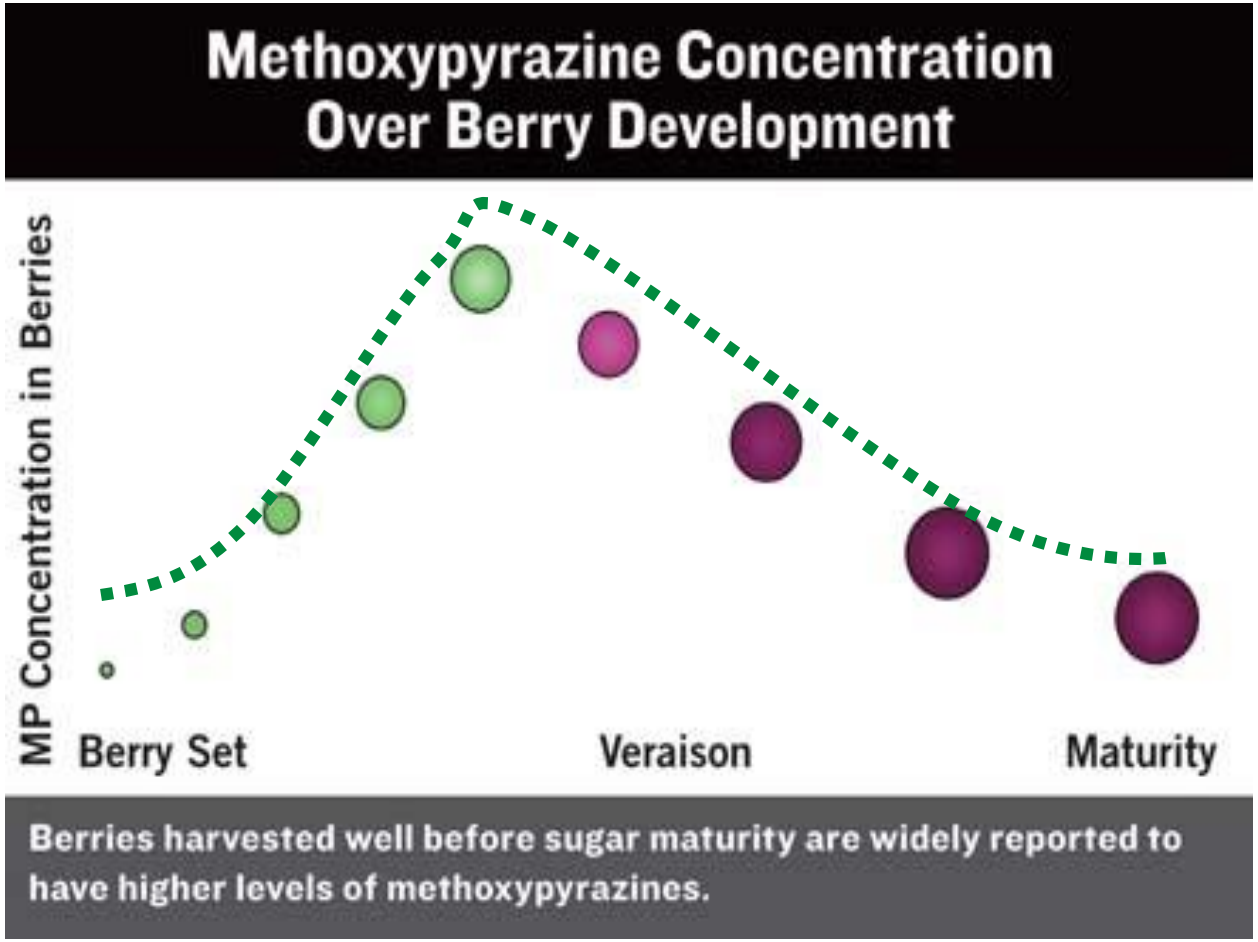
Synthesis of methoxypyrazines

Синтез метоксипиразинов





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Thiols

Тиолы

4-methyl-4-sulfanylpentan-2-one (4MSP); 0.8 ng/L

3-sulfanyl-hexylacetate (3SHA); 4 ng/L

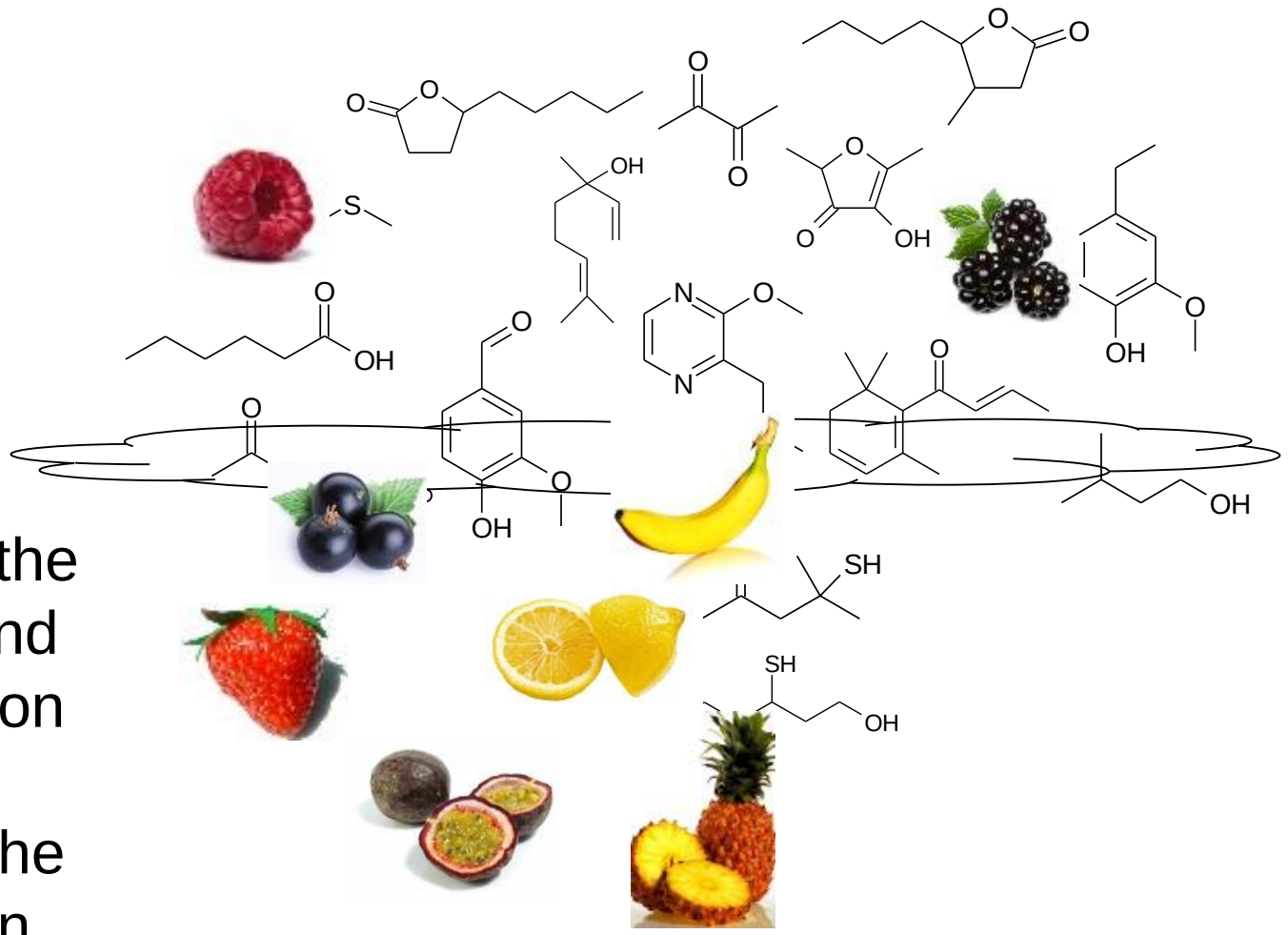
3-sulfanylhexan-1-ol (3SH); 60 ng/L (Darriet *et al*., 1995; Tominaga *et al*., 1998; Dubourdieu *et al*., 2006)

Esters

- Yeast derived aroma

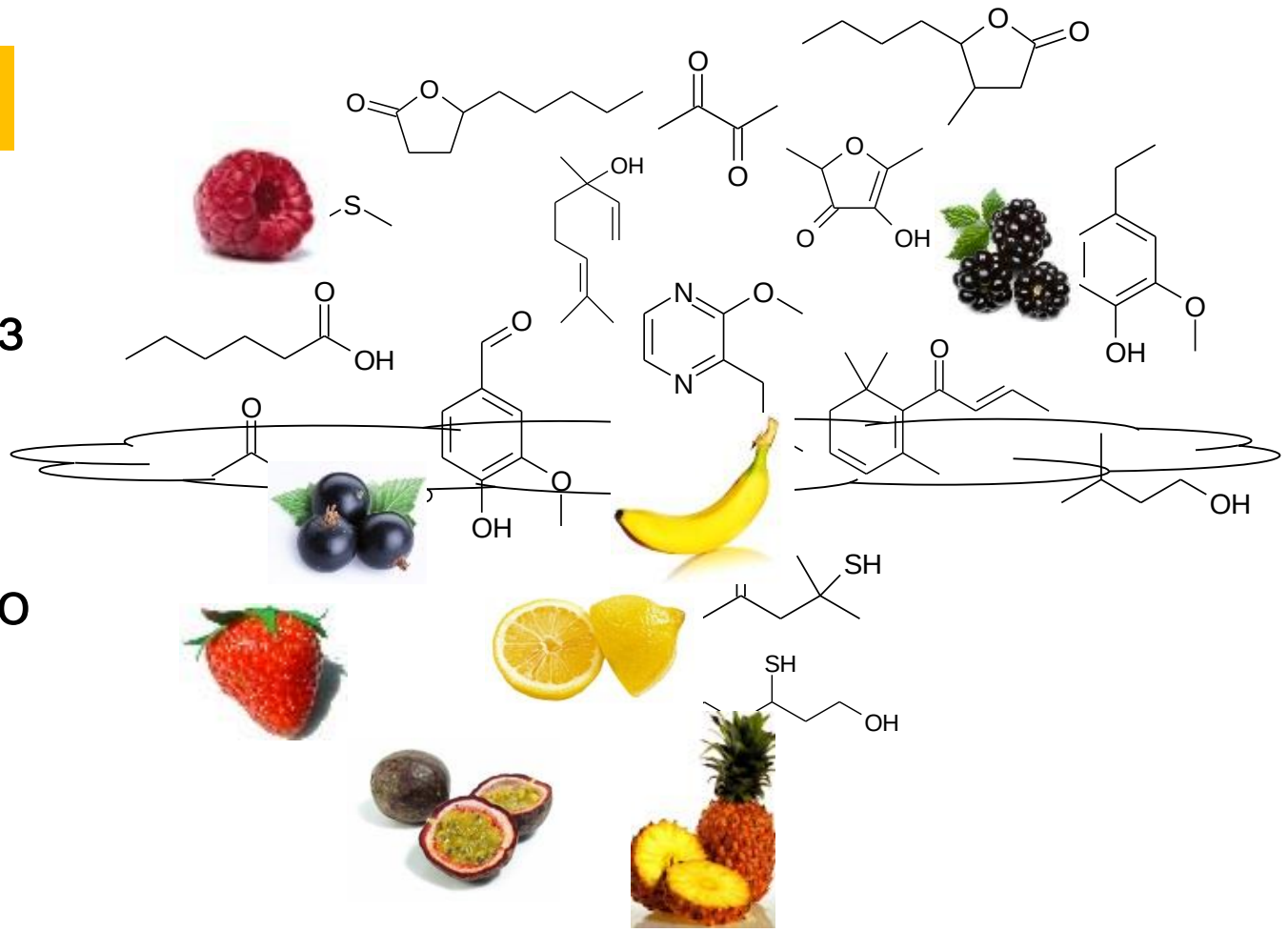
- Influenced by the amino acids and lipid composition

- Contribute to the fruity aromas in wine

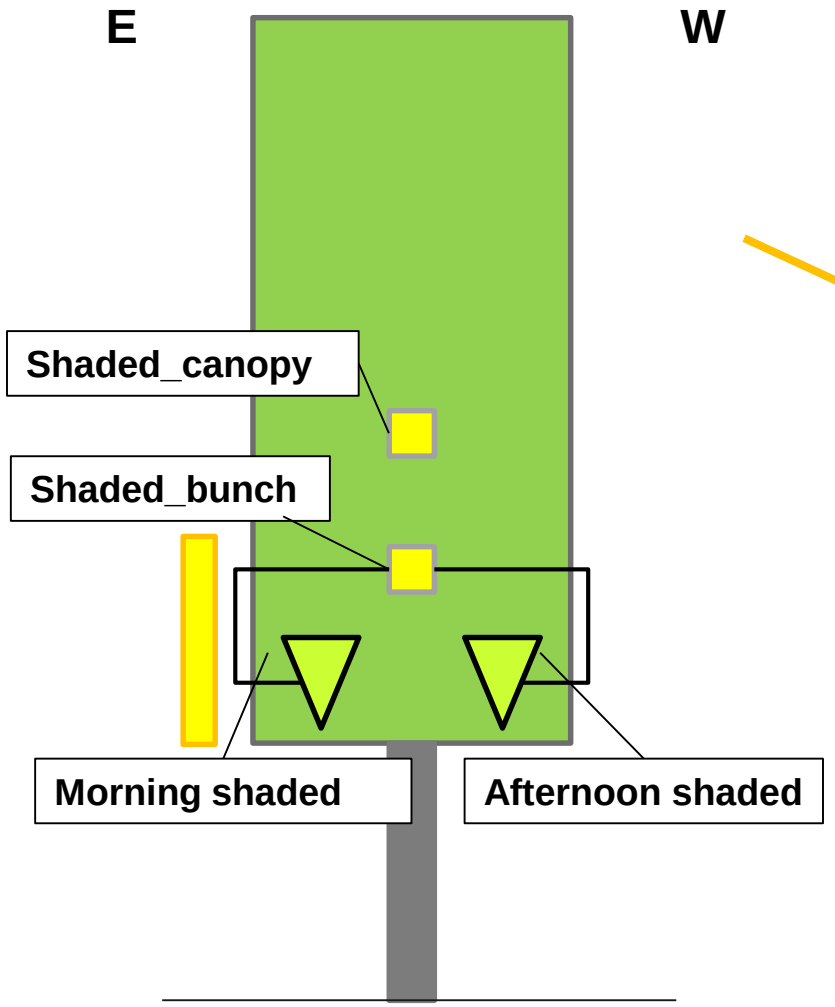


Эстеры

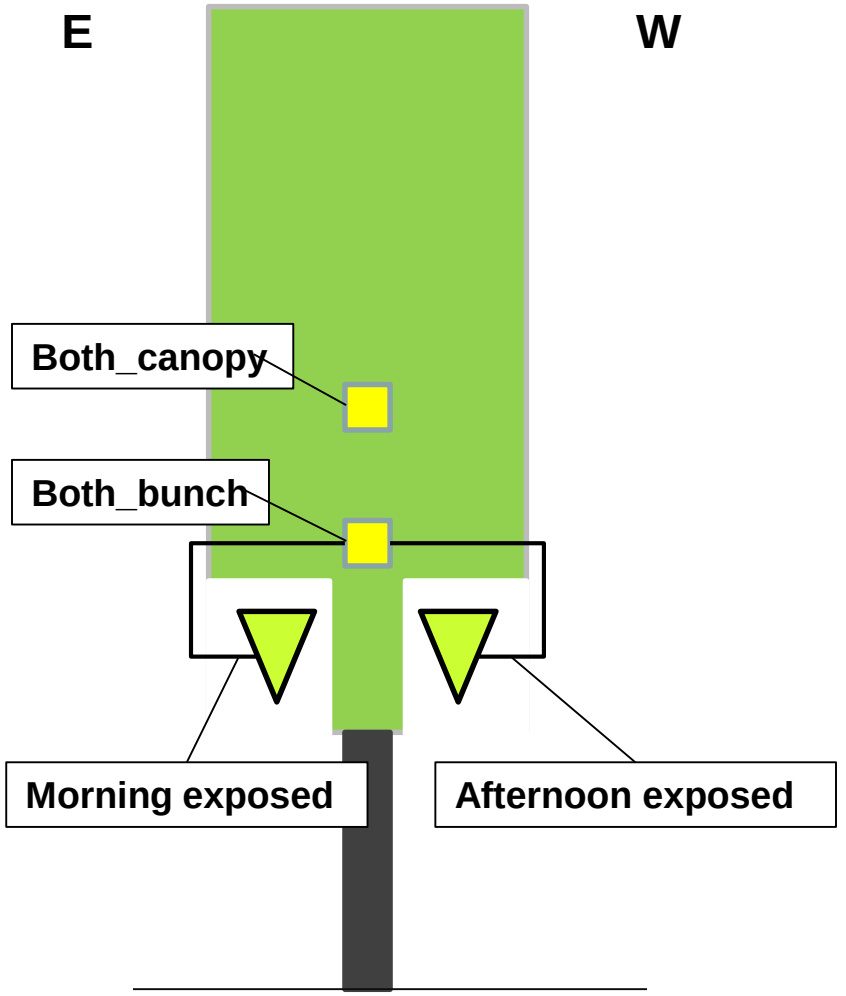
- Аромат, происходящий из дрожжей
- Зависят от аминокислотного и липидного состава
- Способствуют появлению фруктовых ароматов в вине



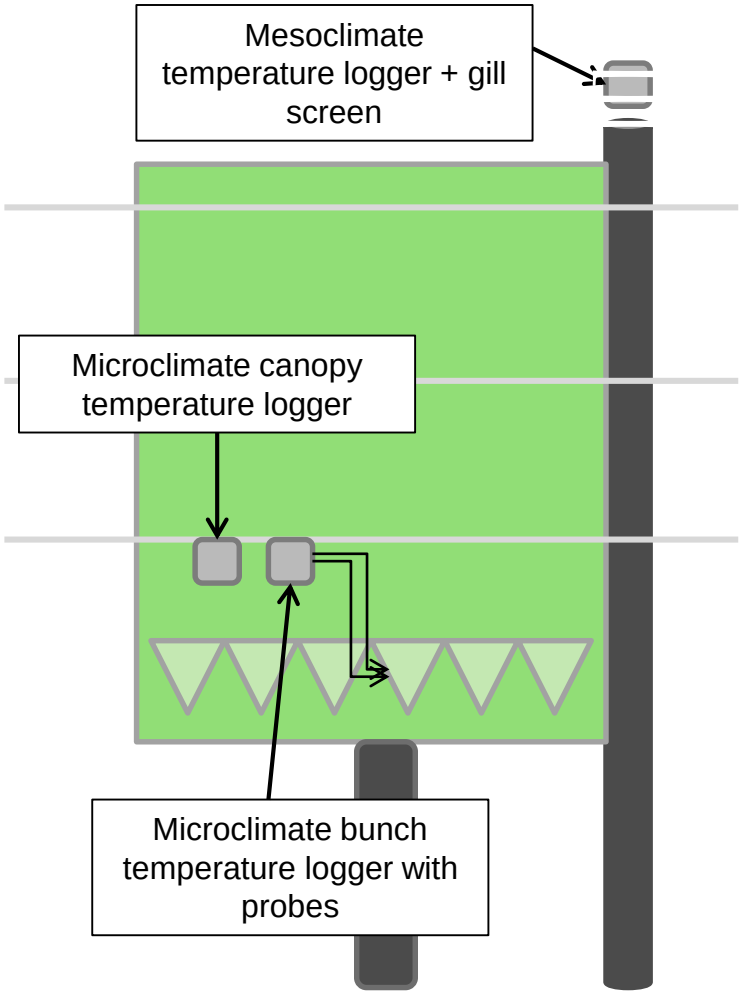
No leaf removal treatment-UV **(C-UV)**



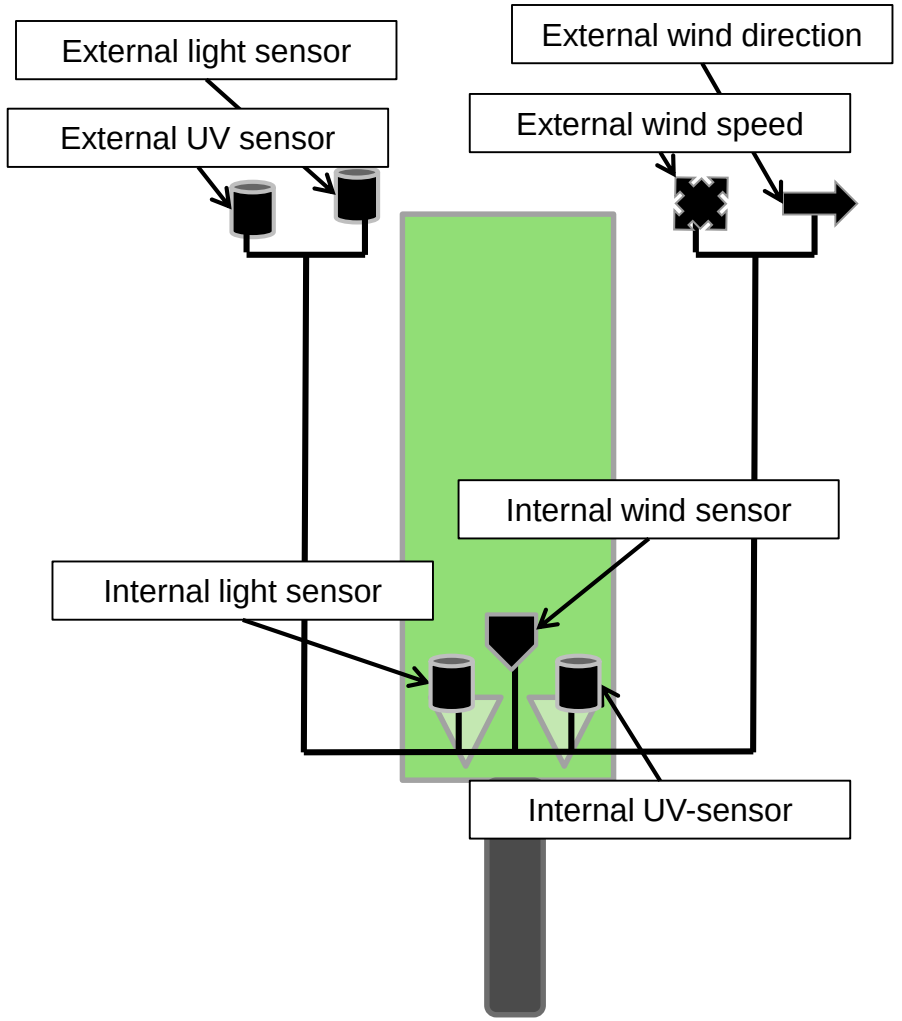
Both sides leaf removal **(B-LR)**



Sensor and logger placement in the canopy



Temperature loggers



Internal sensors set-up

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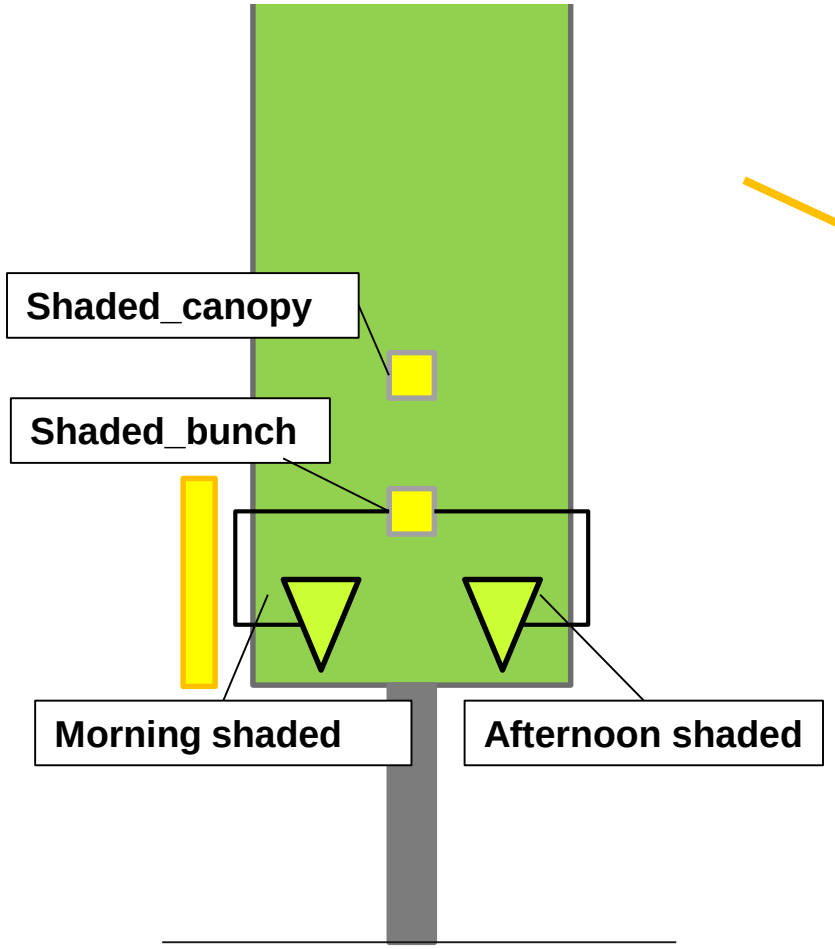
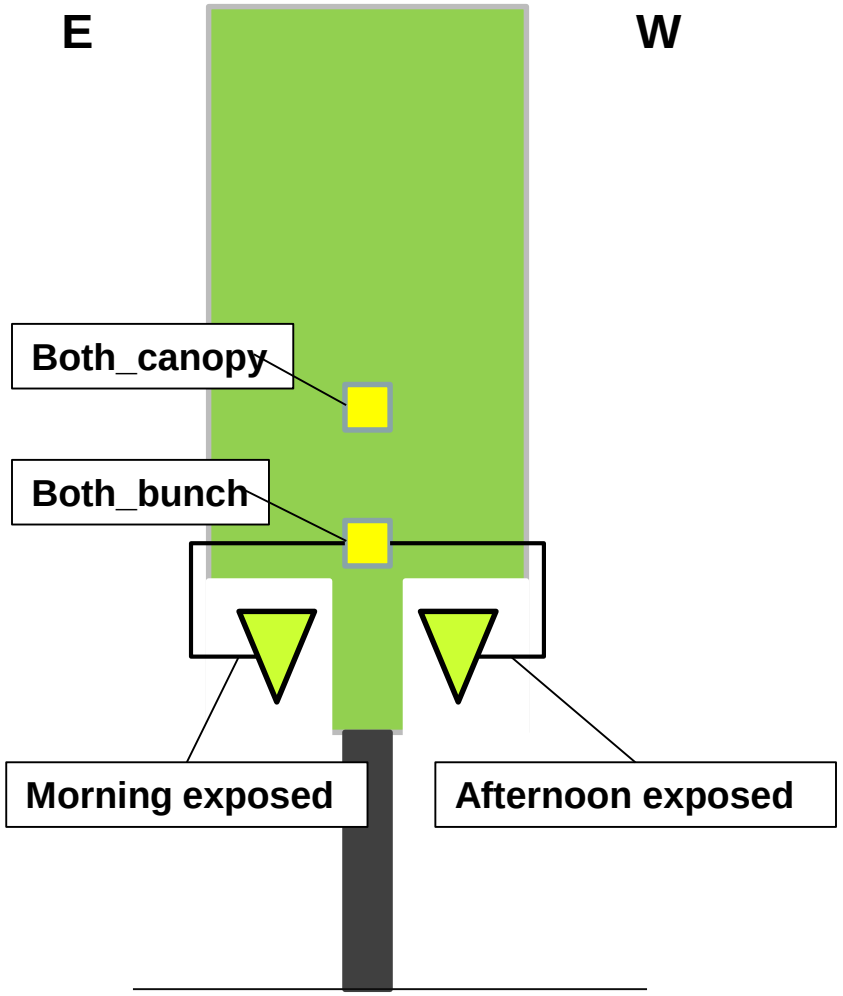
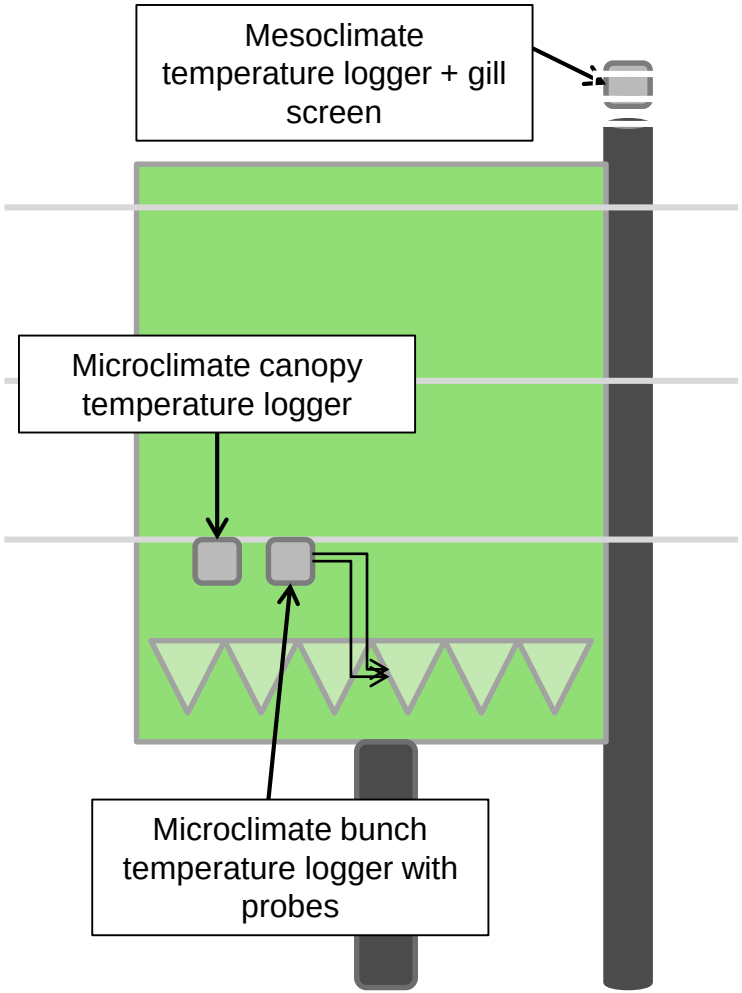
Эксперимент, где листья не удаляли в зоне гроздей **(C-UV)**



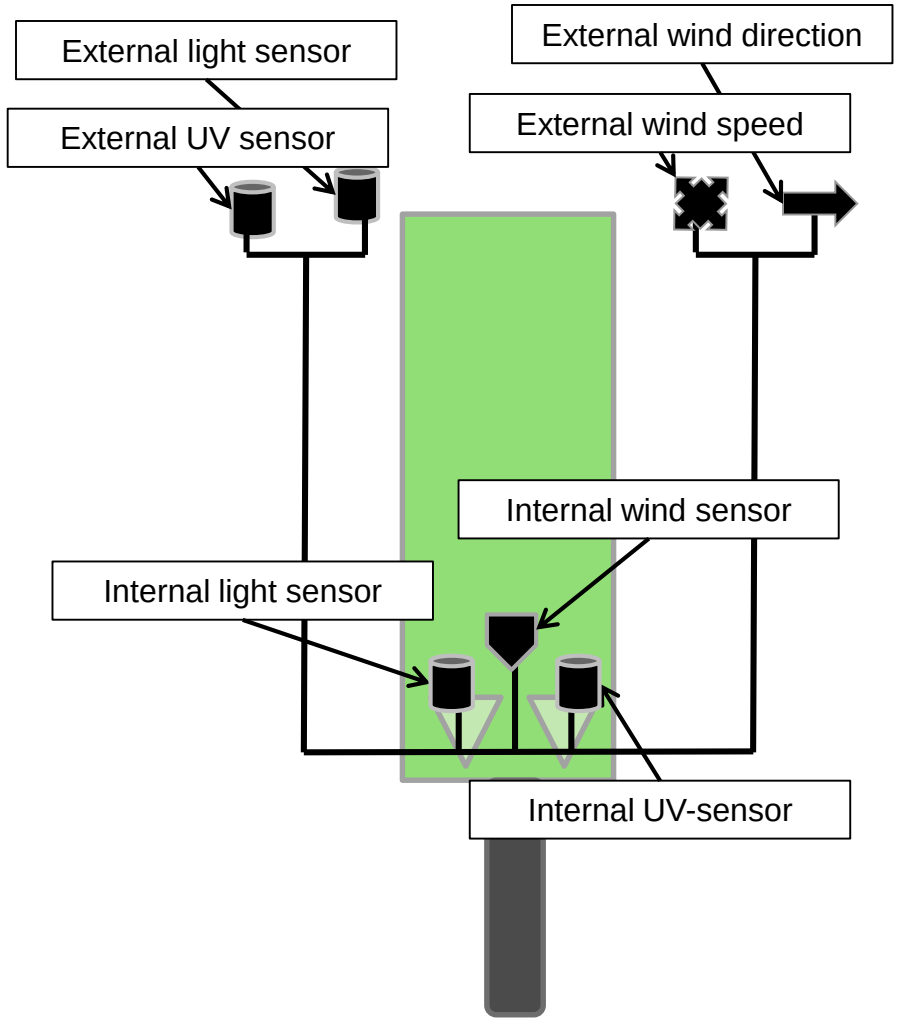
Эксперимент с удалением листьев в обеих зонах гроздей **(B-LR)**



Размещение датчиков и регистраторов в кроне



Temperature loggers



Internal sensors set-up

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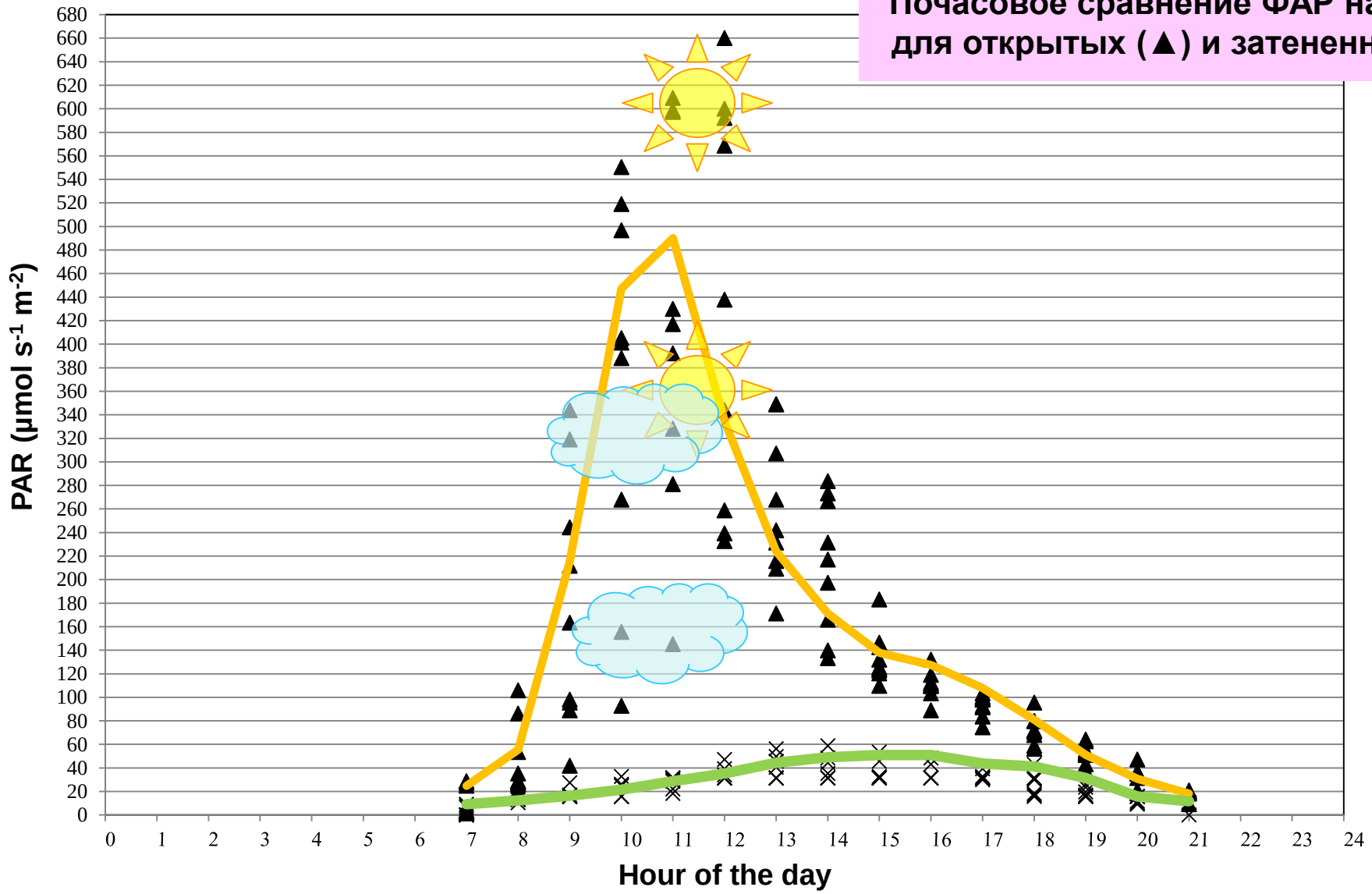
An hourly comparison of PAR at the bunch level for the exposed (▲) and shaded (X) treatments in µmol s^{-1} m^{-2}

Почасовое сравнение ФАР на уровне гроздей для открытых (▲) и затененных (X) образцов



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Wine analyses

Анализ вин

- Wine analyses

Glutathione (GSH)	HPLC (*Janes et al., 2010*)
Methoxypyrazines (IBMP, IPMP)	GC-MS *(Suklje et al., 2012)*
Esters	GC-MS *(Antalick et al., 2010)*
Thiols (3SH and 3SHA)	GC-MS *(Tominaga et al., 1998, Suklje et al., accepted)*
Wine sensory evaluation	10 trained wine evaluaters

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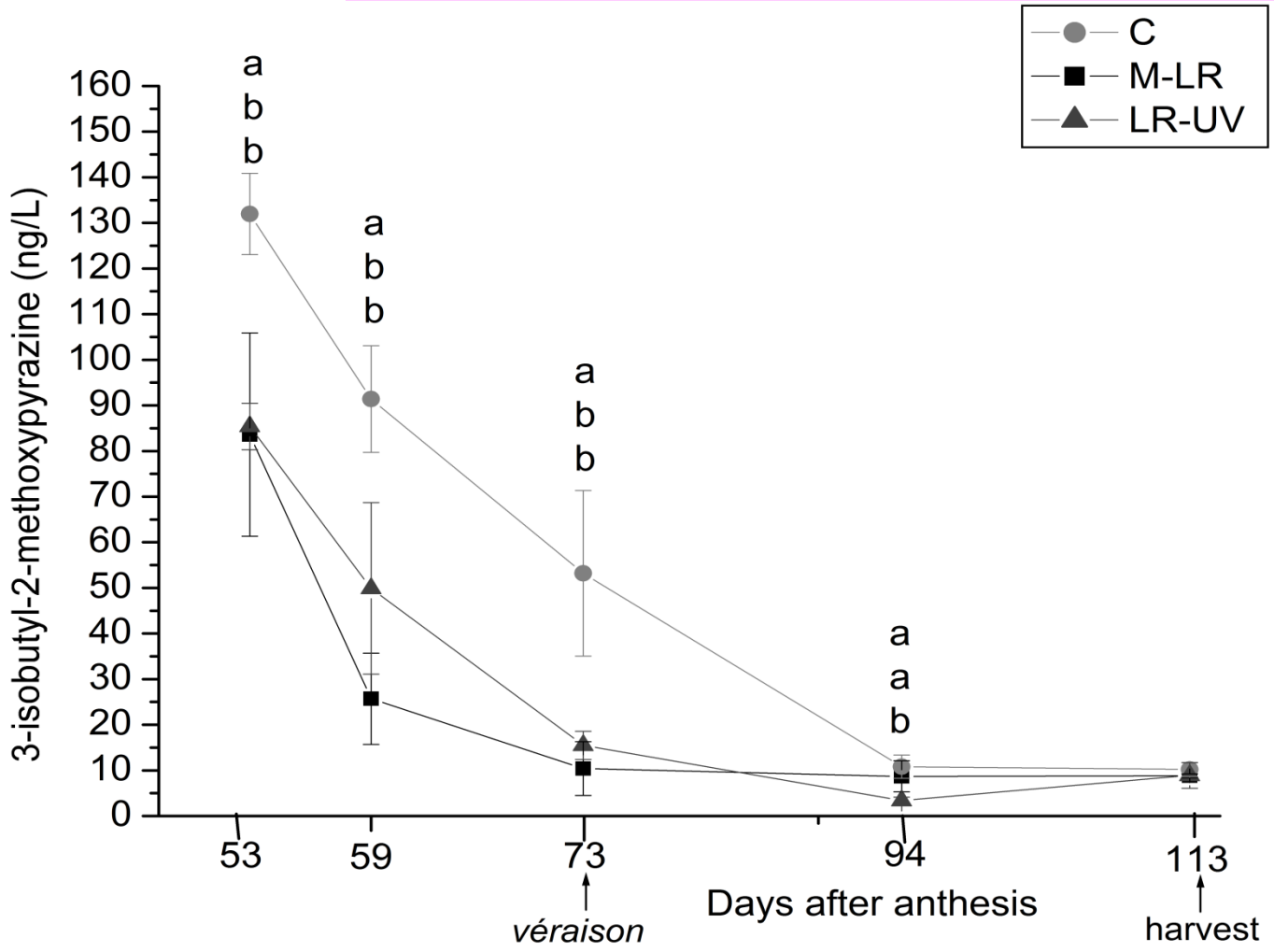
Effect of treatment on the IBMP content during ripening of the berries

Влияние удаления листьев в зоне гроздей на содержание пиразинов в ягодах в течение их созревания



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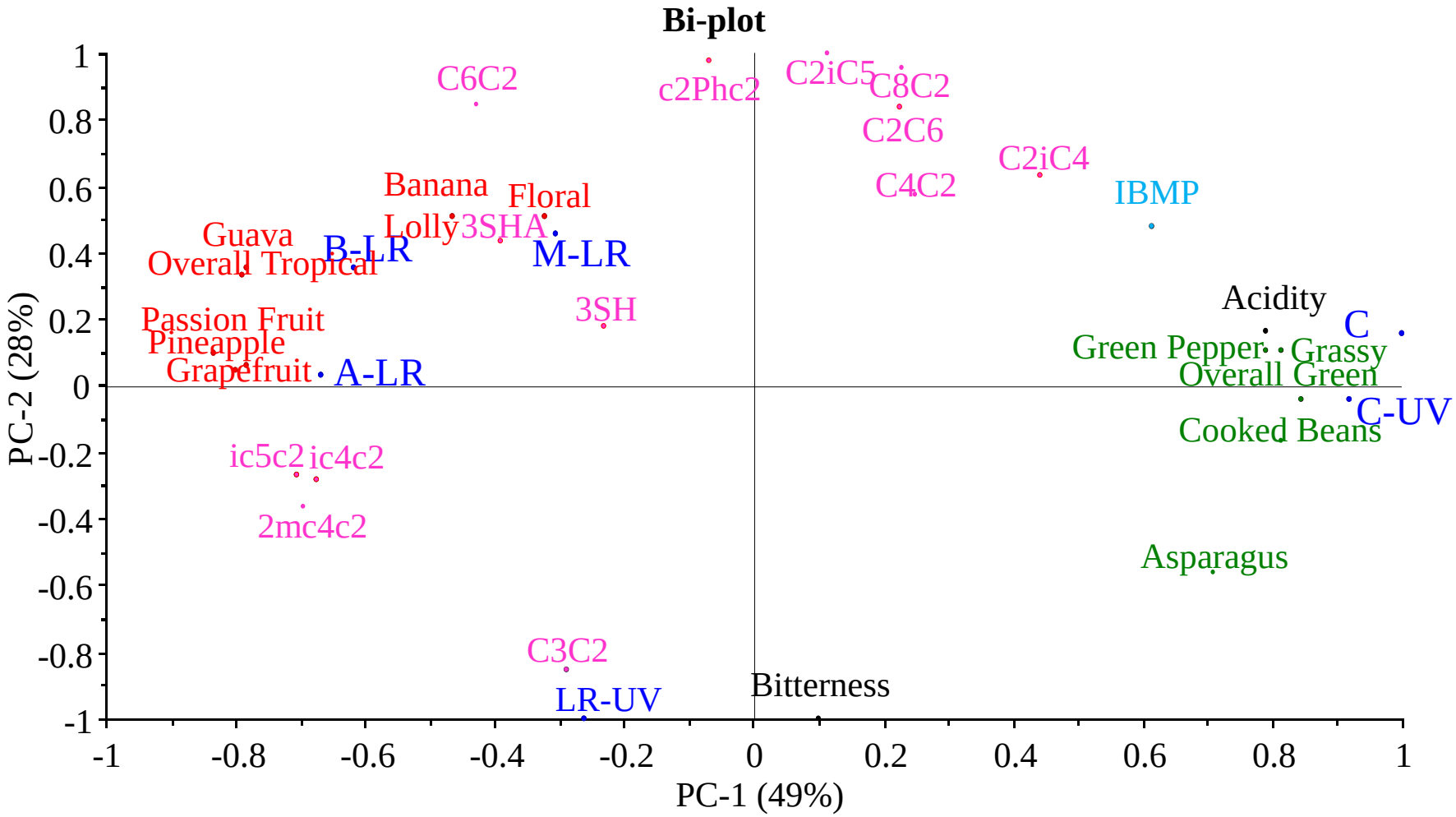
PCA Bi-Plot of Chemical and Sensory parameters

Применение Метода Главных Компонент для анализа химических и сенсорных параметров вин



Effect of leaf removal and ultraviolet radiation on the composition and sensory perception of *Vitis vinifera* L. cv. Sauvignon Blanc wine

K. ŠUKLJE[1,2*], G. ANTALICK[3*], Z. COETZEE[2], L.M. SCHMIDTKE[4,5], H. BAŠA ČESNIK[1], J. BRANDT[2], W.J. du TOIT[2], K. LISJAK[1] and A. DELOIRE[2*]

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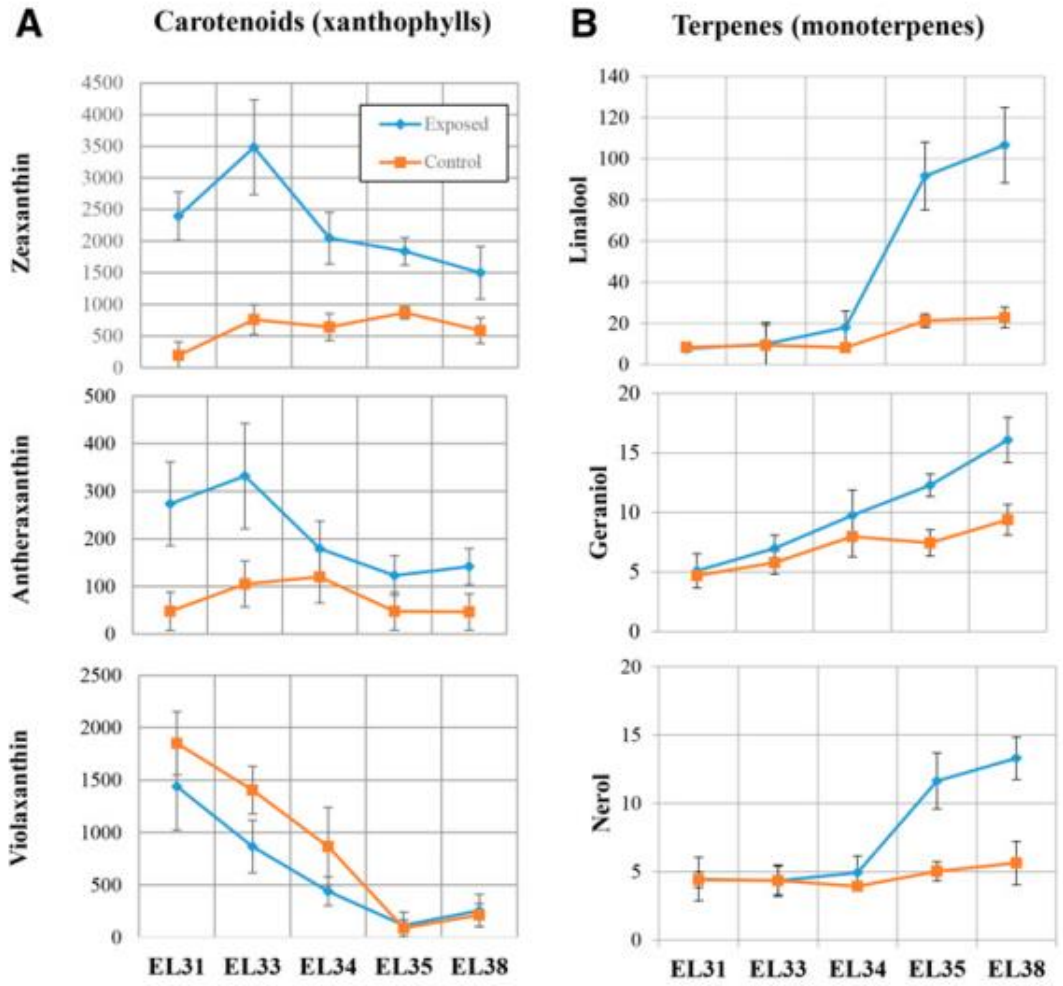
Corresponding author: Professor Alain Deloire, email adeloire@csu.edu.au



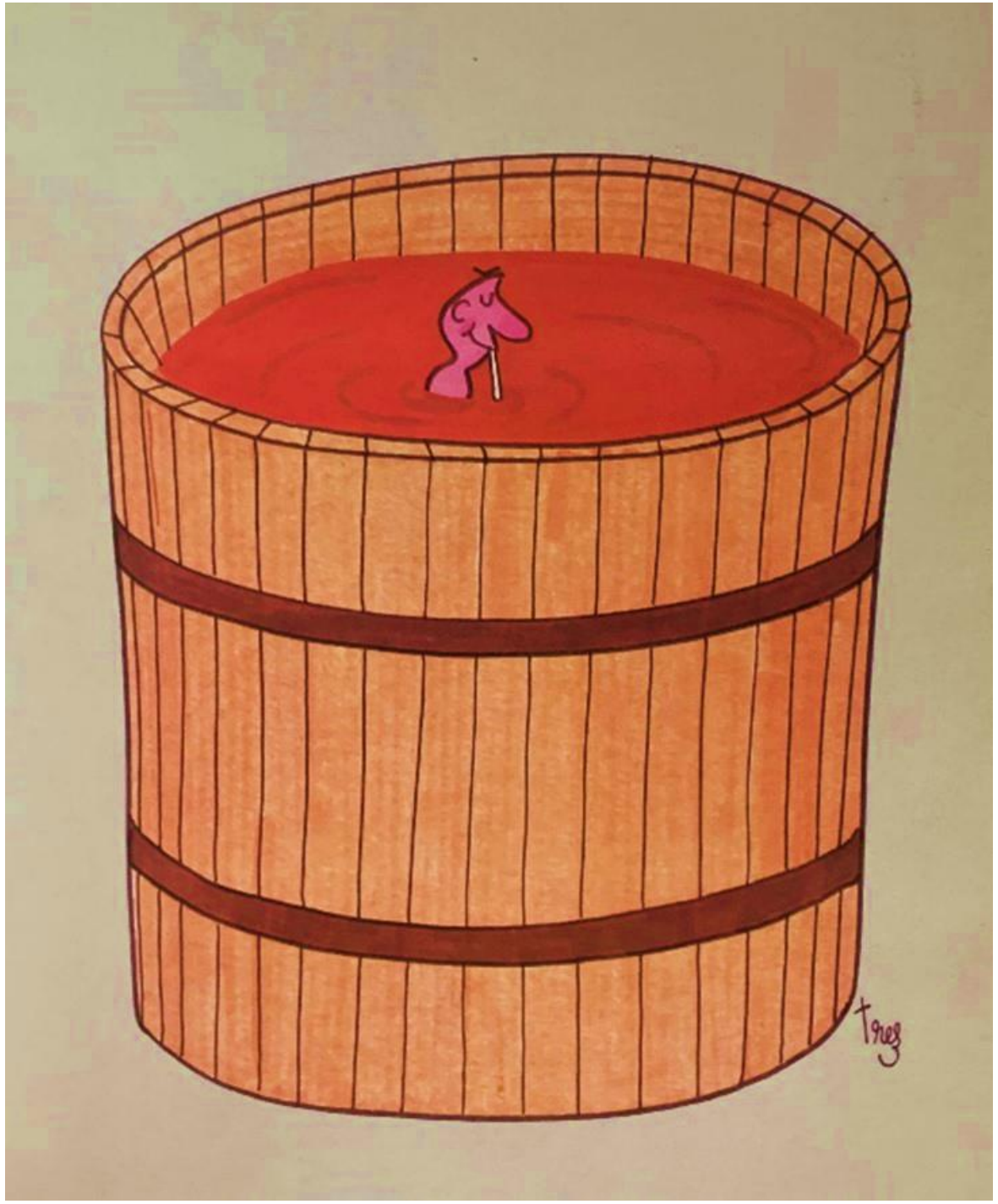
C

Exposed:Control (log_2 ratio)	EL31	EL33	EL34	EL35	EL38
Zeaxanthin	3.6[c]	2.2[c]	1.7[c]	1.1[c]	1.4[c]
Antheraxanthin	2.5[c]	1.7[c]	0.6	1.4[b]	1.6[b]
Trans-Linalol-oxide	1.1[b]	0.7	0.6	0.5	1.1[a]
α-Terpineol	0.8[b]	0.5	0.6[a]	0.9[b]	1.3[b]
Eucalyptol	0.7[a]	0.0	-0.2	0.2	0.7
4-Terpineol	0.6[b]	0.4[a]	0.3	0.4	0.2
Lutein	0.6[c]	0.5[c]	0.1	0.1	0.1
γ-Terpinene	0.6[a]	0.4[a]	0.5	0.5	1.0[b]
Succinic acid	0.3[b]	0.2	0.4[a]	-0.4	-0.4
Geranylacetone	0.3[a]	0.5	0.7[a]	1.0[b]	0.8[c]
6-Methyl-6-hepten-2-one (MHO)	0.2	0.6	0.5[a]	0.7[a]	0.5[b]
ß-carotene	0.2[a]	0.1[b]	-0.3	-0.4[a]	-0.5
ß-Damascone	0.2	0.0	0.0	0.0	0.0
Limonene	0.2	0.2	0.4	0.1	0.7
ß-Damascenone	0.2	0.5[b]	0.3	0.5	0.4[b]
Neoxanthin_like	0.2	0.1	-0.2	-0.1	-1.3
Neoxanthin	0.1	0.0	-0.3	-0.4	-0.7
Pseudo-ionone	0.1	0.2	0.4	0.6[a]	0.4[c]
Tartaric acid	0.1[c]	-0.1	0.0	0.0	0.2[c]
Geraniol	0.1	0.3	0.3	0.7[c]	0.8[c]
Chlorophyll a	0.1	0.1[a]	-0.2	-0.3[a]	-0.5
Chlorophyll b	0.1	0.2[a]	-0.3	-0.4[a]	-0.7
Citronellol	0.1	0.0	-0.2	0.0	0.1
Malic acid	0.0	-0.2	-0.2	-0.5[a]	-0.6[a]
Nerol	0.0	0.0	0.3	1.2[c]	1.2[c]
Cis-Linalol-oxide	0.0	0.1	0.0	0.3	-0.9
Glucose	-0.1	0.5	0.2	0.0	0.2[a]
ß-ionone	-0.1	0.0	-0.1	-0.2	-0.3[a]
Linalool	-0.1	0.1	1.1[a]	2.1[c]	2.2[c]
Violaxanthin_like	-0.3	-0.7[b]	-1.0[a]	0.0	0.3
α-ionone	-0.3	-0.1	0.0	0.0	0.1
Fructose	-0.4	0.8	0.3	0.0	0.2[b]
Violaxanthin	-0.4	-0.7[b]	-1.0[a]	1.0	0.2
Lutein epoxide	-2.3[c]	-1.4[c]	-0.8	1.0	2.6[c]

[a]: 0.01<p-value<0.05; [b]: 0.001<p-value<0.01; [c]: p-value<0.001

Figure 6. Bar graphs of selected individual carotenoids (A; ng/g FW) and monoterpenes (B; ng/g FW) as well as a heat map (log_2 fold change) representation of all analyzed metabolites (C). FW, Fresh weight.

Young et al., 2015, Plant Physiology, Vol 170, p. 1235-1254



Independently or in parallel with chemical analyses of grapes and/or wine, **tasting** and/or **sensory analysis** of wines should be prioritized

Вне зависимости от того, проводятся ли химические анализы винограда и/или вина, следует предпочитать дегустацию и/или сенсорный анализ вин.

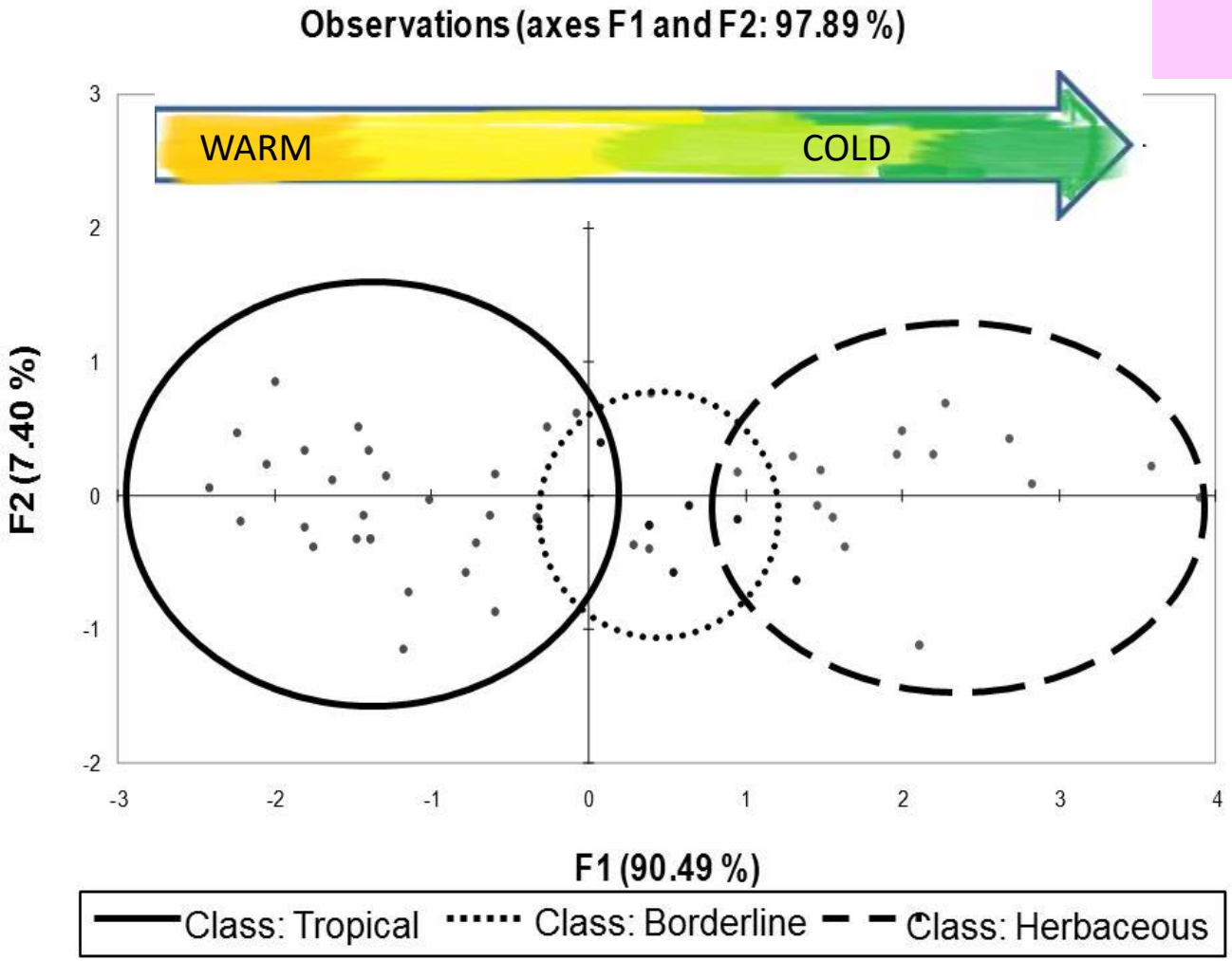
Deloire A., 2023


And now let's applaud
The TEMPERATURE!
А теперь поаплодируем
ТЕМПЕРАТУРЕ !

L'INSTITUT agro Montpellier

Climate: primary driving factor of berry ripening

Климат - основной фактор, влияющий на созревание ягод



Principal component analysis (Axes F1 & F2: 97.89%) of 52 Sauvignon Blanc Wines in the Western Cape Province of South Africa. The style of wine, in terms of intensity of tropical and/or green characteristics, seems mainly related to the thermal condition of the regions at the macroclimatic level (warm versus cool). At the bunch level (microclimate), light and temperature will therefore influence berry composition and the style of wine. Factor 1 (F1) indicated by the horizontal axis explains 90.49% of the variance in the data and factor 2 (F2) indicated by the vertical axis explains 7.40% of the variance in the data set.

Deloire and Distell, 2009

L'INSTITUT agro Montpellier

Yes, but what about... the harvest date then ?

Да, но…

что же насчет даты сбора урожая?

GRAPE RIPENING AND WINE STYLE: SYNCHRONIZED EVOLUTION OF AROMATIC COMPOSITION OF SHIRAZ WINES FROM HOT AND TEMPERATE CLIMATES OF AUSTRALIA

Alain DELOIRE[1,2], Katja ŠUKLJE[1,3], Guillaume ANTALICK[1,3], John BLACKMAN[1,4], Leigh SCHMIDTKE[1,4]

1 National Wine and Grape Industry Centre (NWGIC)
2 l'Institut Agro, Montpellier France
3 Wine Research Centre, University of Nova Gorica
4 Charles Sturt University (CSU)

VINIFERA
Montpellier
31 March 2023

What will be presented today

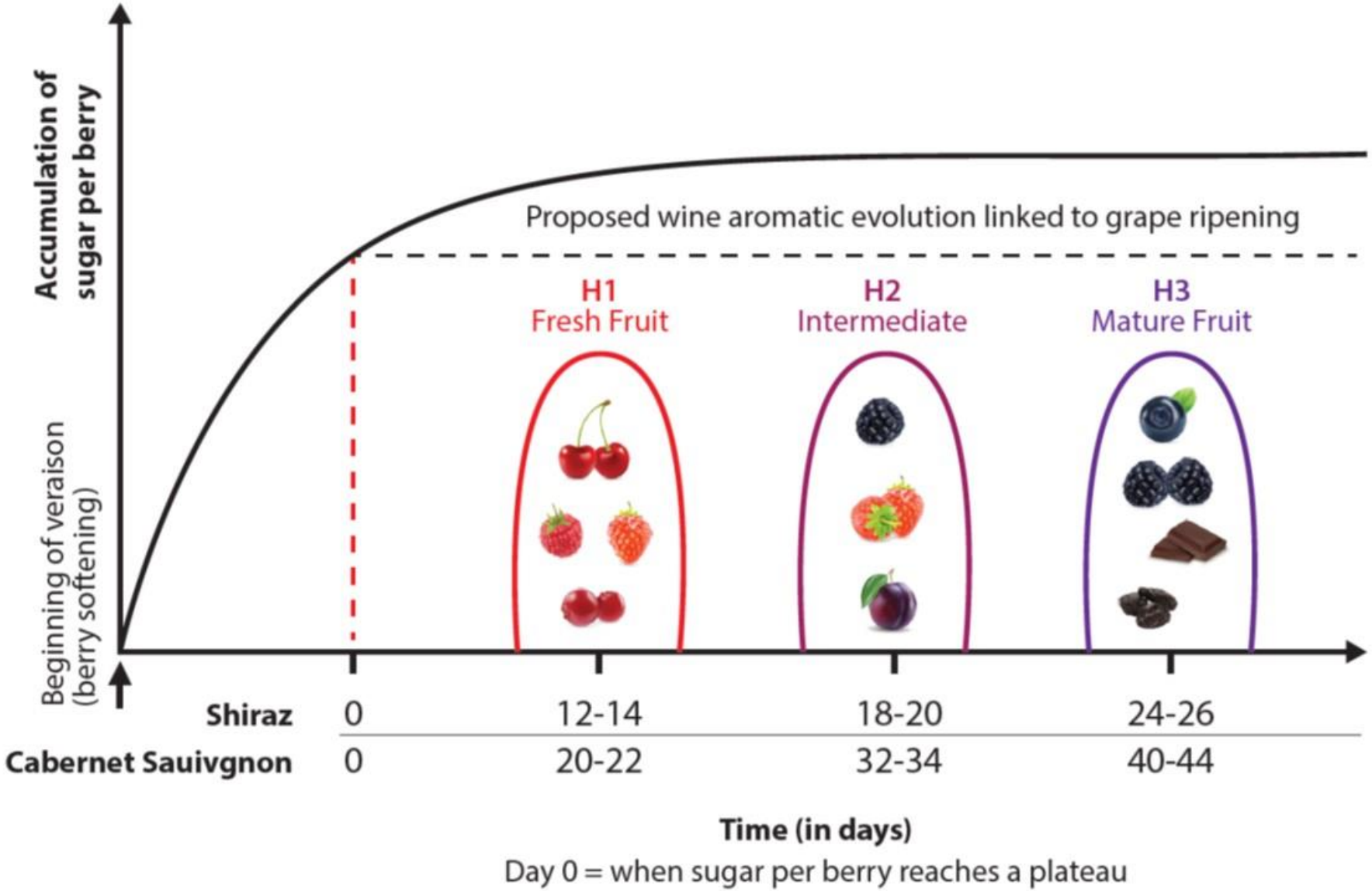
- Grapevine Berry Maturation: a proposed model/method
  - Brief discussion around berry sugar and fresh mass evolution
- Shiraz Sequential Harvest
  - 2014 and 2015 results from Griffith (warm-hot) region in NSW Australia
    - Proposed ripening sequence for Shiraz and Cabernet Sauvignon (CS)
    - Shiraz & (CS) berry and wine composition
    - Shiraz & (CS) sensory analyses
- Take home messages

Что будет представлено сейчас

Предлагается модель/методика созревания ягод виноградной лозы

– Краткое обсуждение накопления сахара и свежей массы ягод

- Последовательный сбор урожая сорта Шираз
  - Результаты 2014 и 2015 годов из региона Гриффит (тёплый-жаркий климат) в Новом Южном Уэльсе, Австралия
  - Эволюция ароматического профиля сортов Шираз и Каберне Совиньон
  - Состав ягод и вина Шираз и Каберне Совиньона (CS)
  - Сенсорный анализ Шираз и Каберне Совиньон (CS)
- Главные выводы



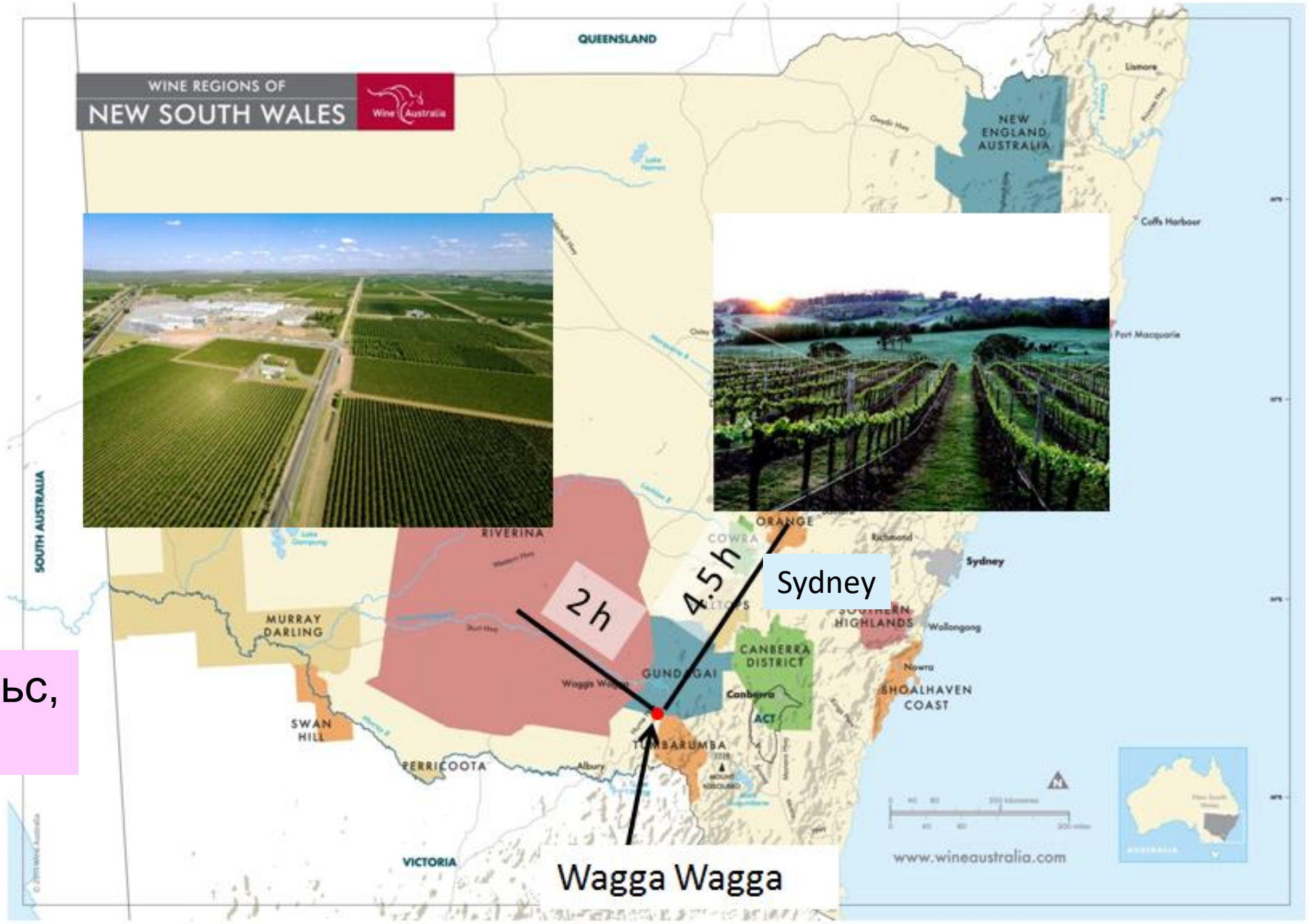
G. Antalick, K. Šuklje, J W. Blackman, L. M. Schmidtke & A Deloire, 2021. Sequential harvest and red wine sensory profile through use of grape berry sugar accumulation. Oeno-One (https://oeno-one.eu/article/view/4527).

L'INSTITUT agro Montpellier

Where?

Australia
New South Wales

Новый Южный Уэльс,
Австралия



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Griffith (Riverina, NSW Australia)

Example of vineyard
and
Cultural practices

Примеры виноградников и особенности возделывания

Sprawling training system

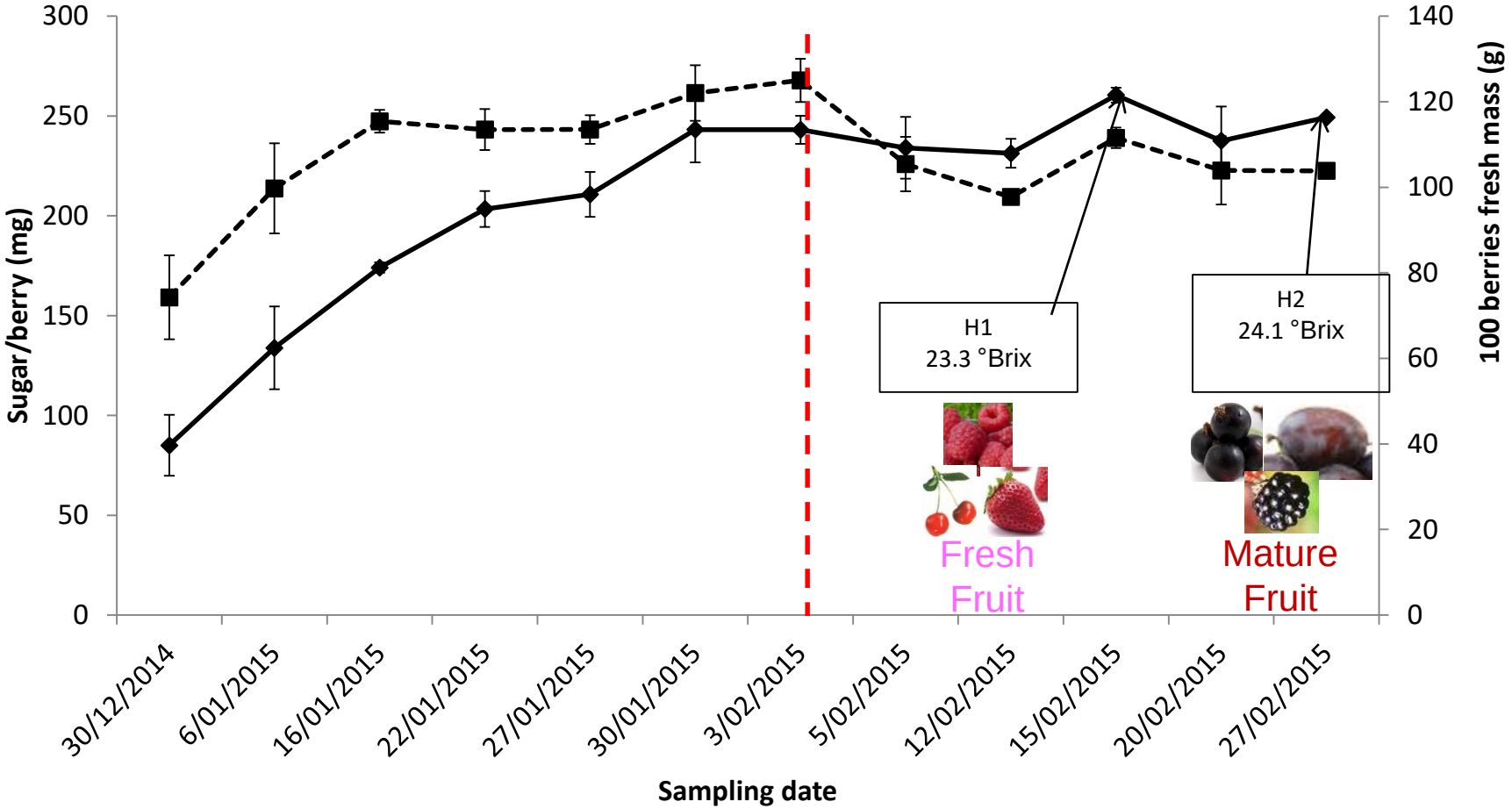
кордон без шпалер

What am I going to talk about?

Sequential harvest according to berry sugar accumulation

О чем мы будем говорить?

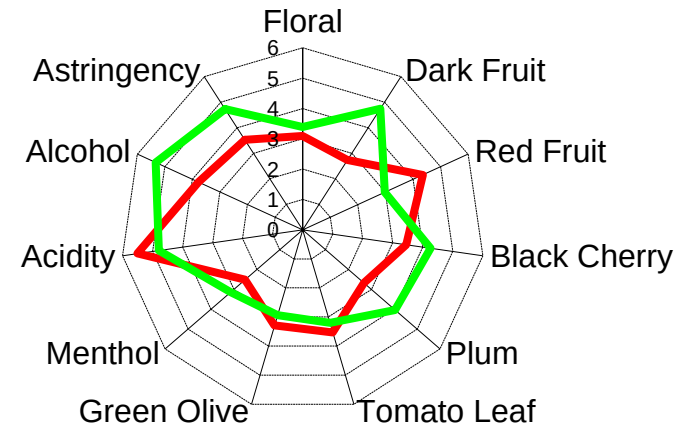
Поочередный (последовательный) сбор урожая в соответствии с накоплением сахара в ягодах



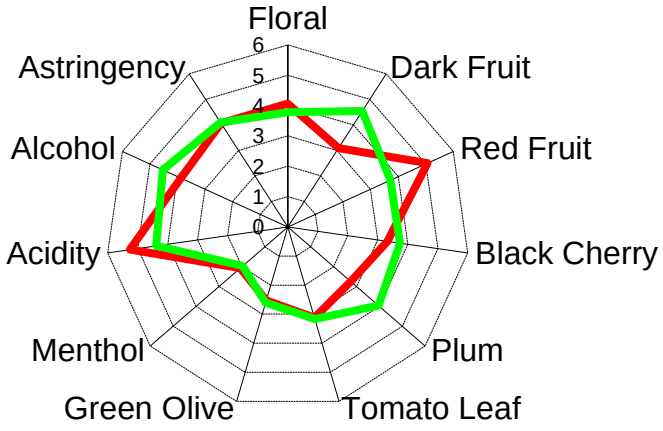
Suklje et al, 2015

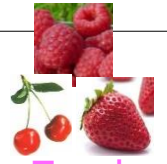
Some results… → Sensory analyses (Warm climate)

2014



2015





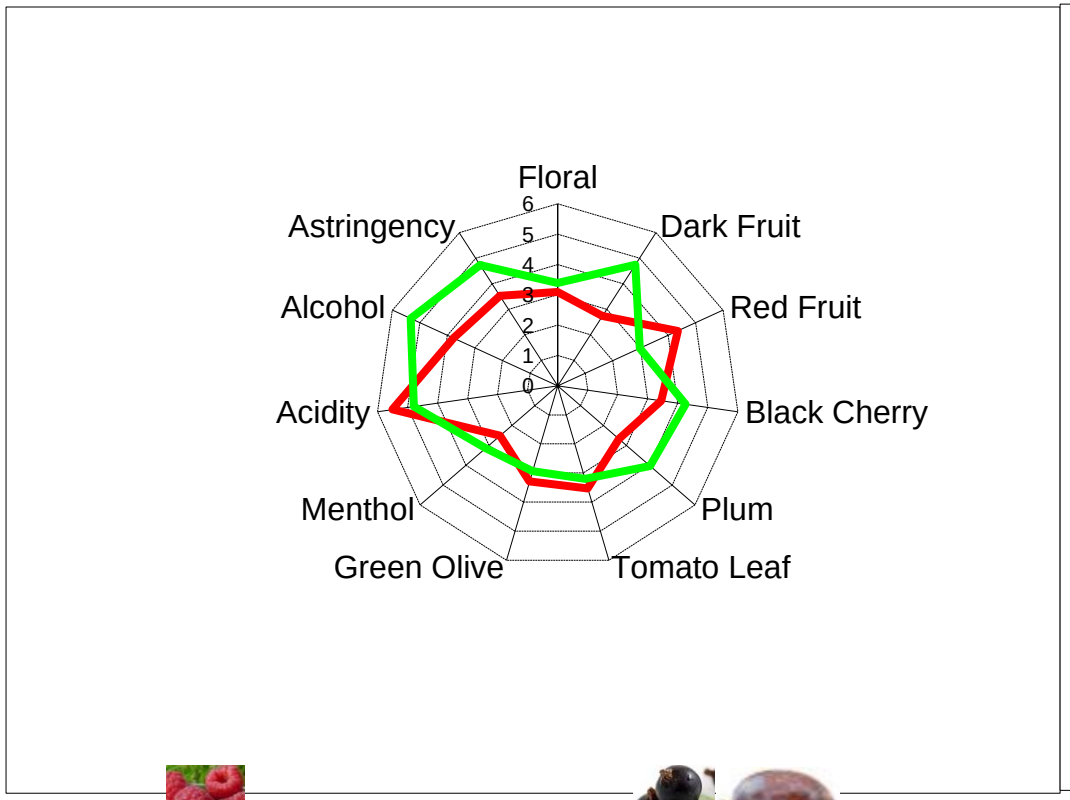
Fresh Fruit

Mature Fruit

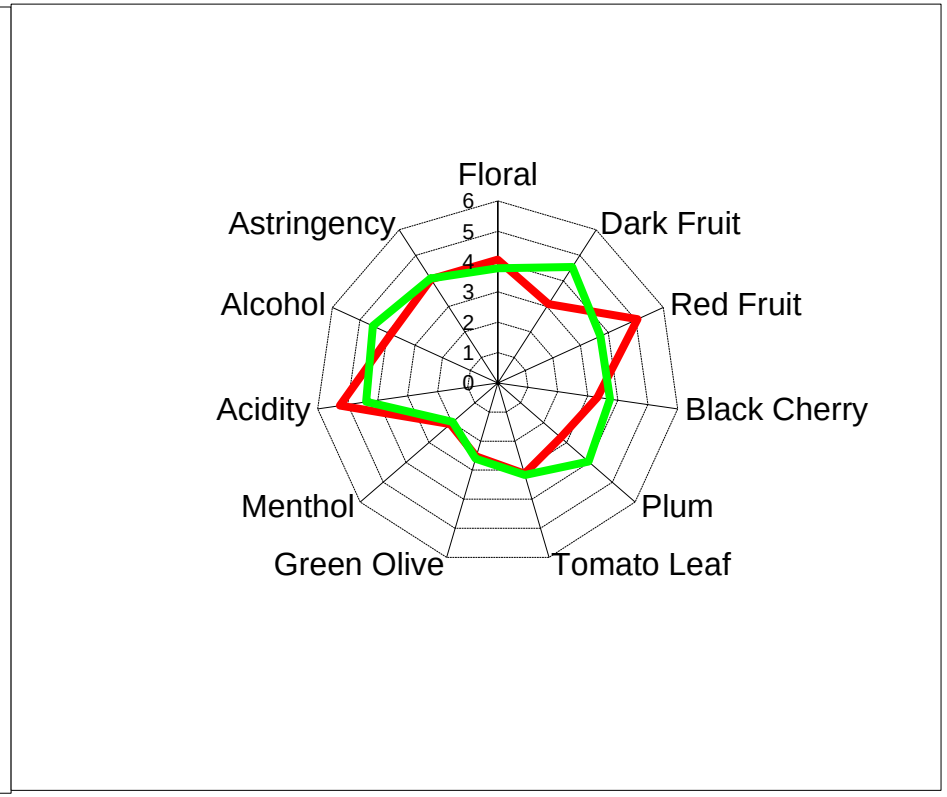
Blackman et al., 2014, 2015

Некоторые результаты … → Сенсорный анализ (теплый климат)

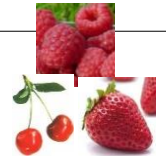
2014



2015



Blackman et al., 2014, 2015



свежие фрукты и ягоды

зрелые фрукты и ягоды

Some results… → Wine markers of early harvest

C6-compounds

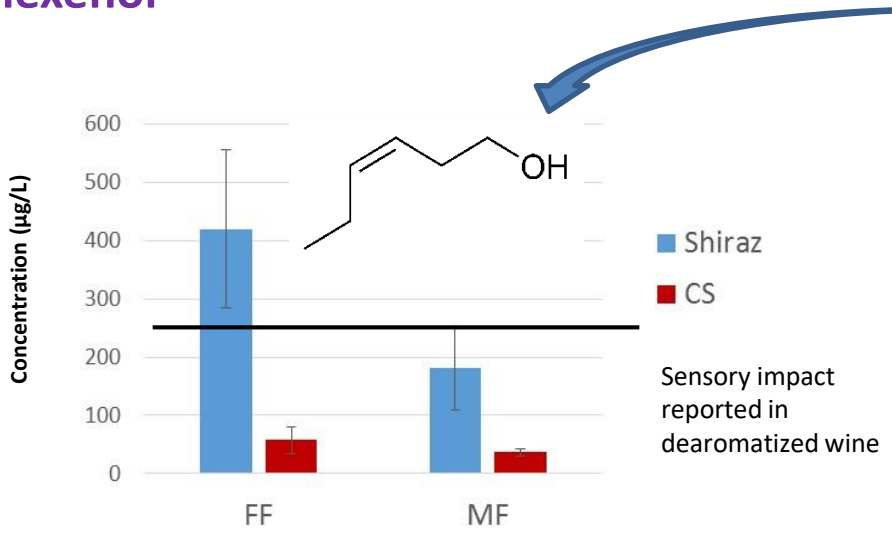
Hexanol

Trans-2-hexenol

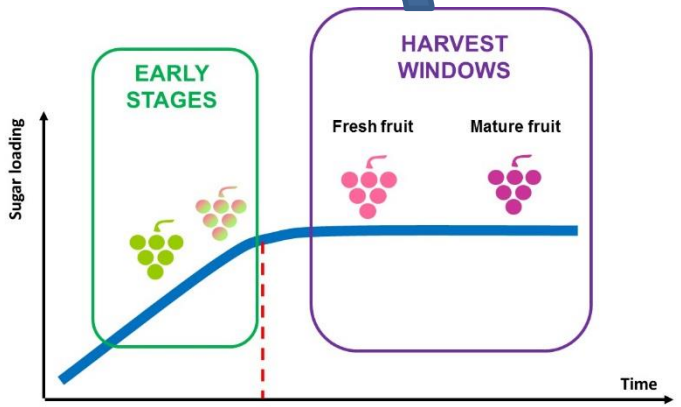
Trans-3-hexenol

Cis-3-hexenol

Herbaceous, grassy, fresh aromas



Sensory impact reported in dearomatized wine



Cis-3-hexenol: marker of Fresh Fruit Shiraz

Antalick et al., 2014, 2015

Некоторые результаты… → Винные индикаторы при раннем сборе урожая

C6-compounds

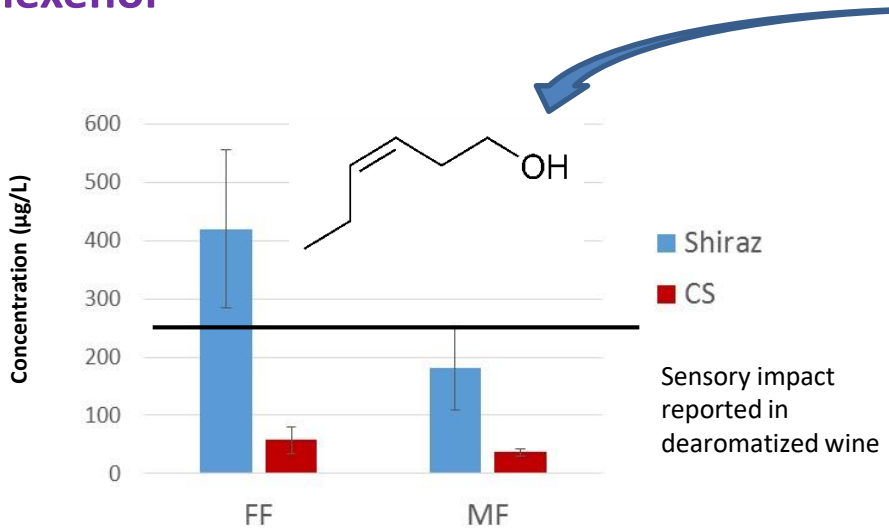
Hexanol

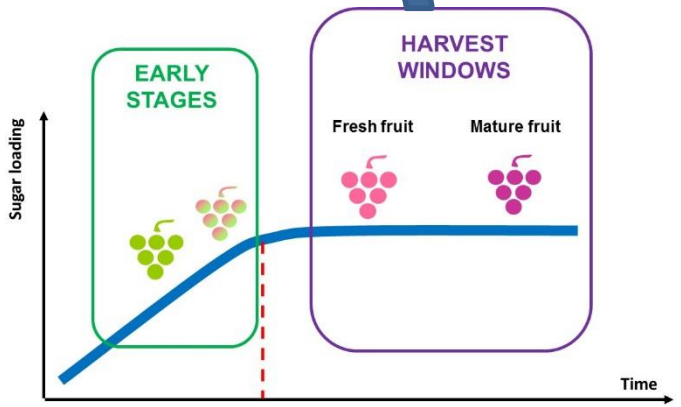
Trans-2-hexenol

Trans-3-hexenol

Cis-3-hexenol

травяные и свежие ароматы



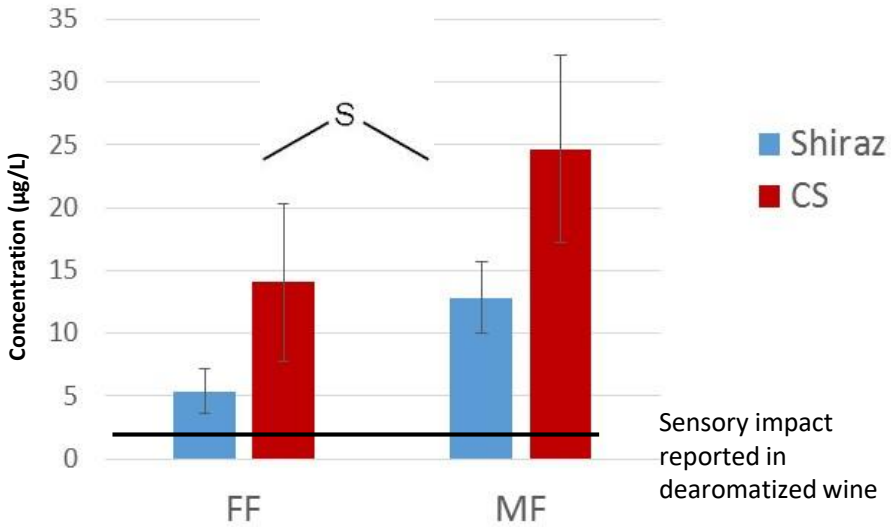


Cis-3-hexenol: индикатор аромата свежих фруктов для сорта Шираз (Shiraz)

Antalick et al., 2014, 2015

Some results… → Varietal Marker of Mature Fruit Stage

Dimethyl sulphide (DMS): marker of late maturity stage irrespective of the cultivar



Sensory impact reported in dearomatized wine

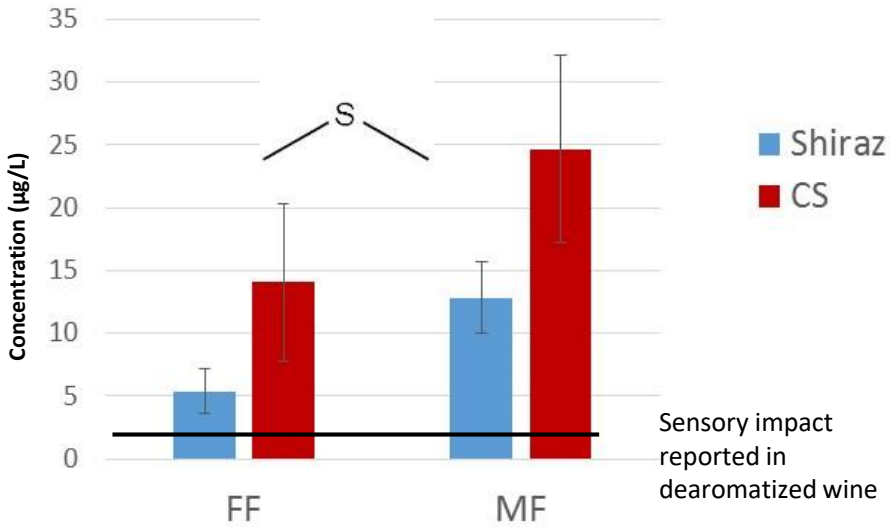
Dark fruit, stewed fruit, truffle

Dagan, 2006; Bindon et al. 2014

Antalick et al., 2014, 2015

Некоторые результаты … ⟶ Сортовой индикатор на стадии зрелых ягод

Диметилсульфид (DMS): индикатор поздней зрелости, не зависит от сорта



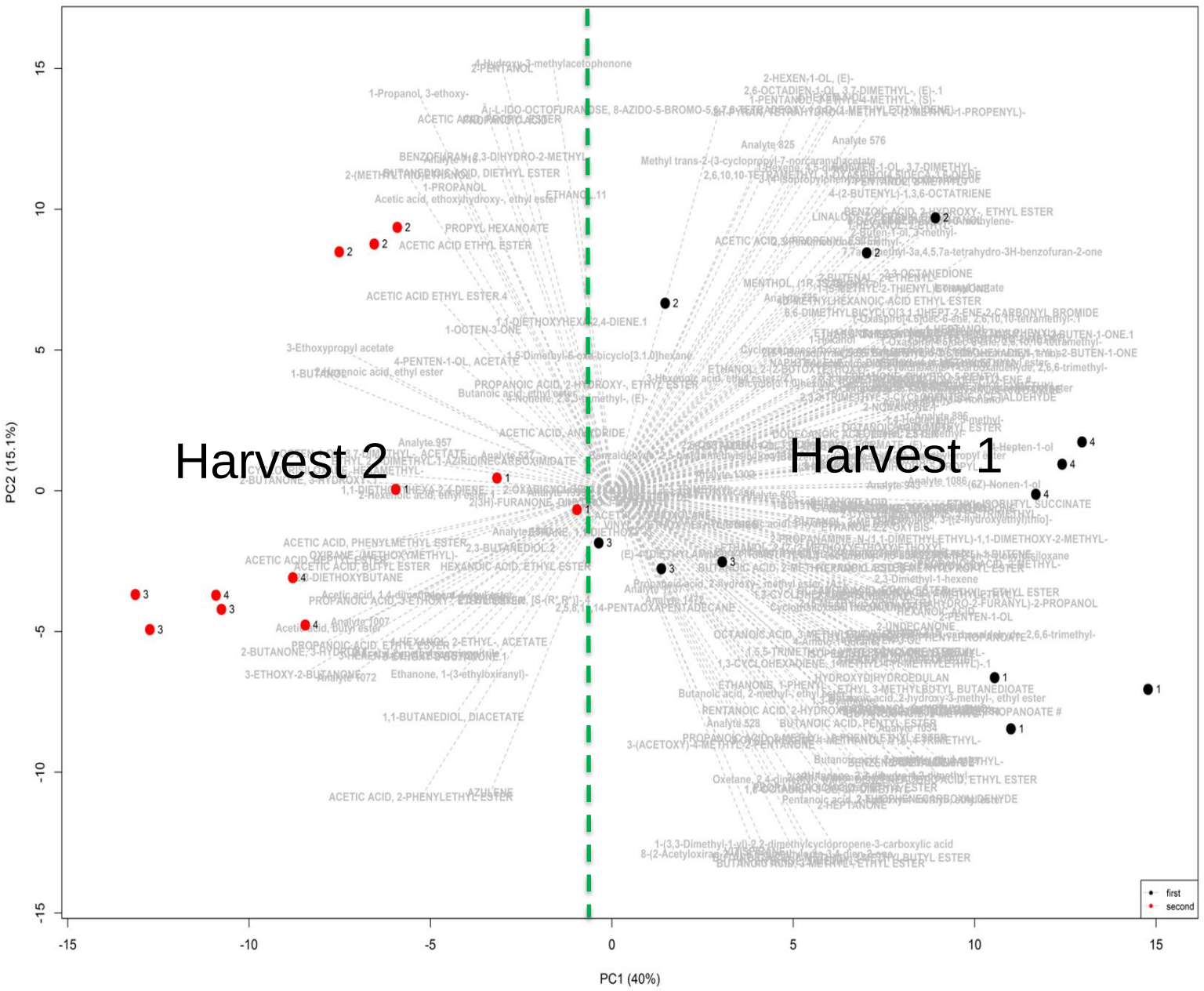
Ароматы - Тёмные фрукты, джем, трюфели

Dagan, 2006; Bindon et al. 2014

Antalick et al., 2014, 2015

Mature Fruit

Fresh Fruit



Separation of wine samples according to the principal component analyses based on the grape harvest date

1. **Significant modifications of 175 wine volatiles according to the harvest date, irrespective of the vineyard management within the same macroclimate.**

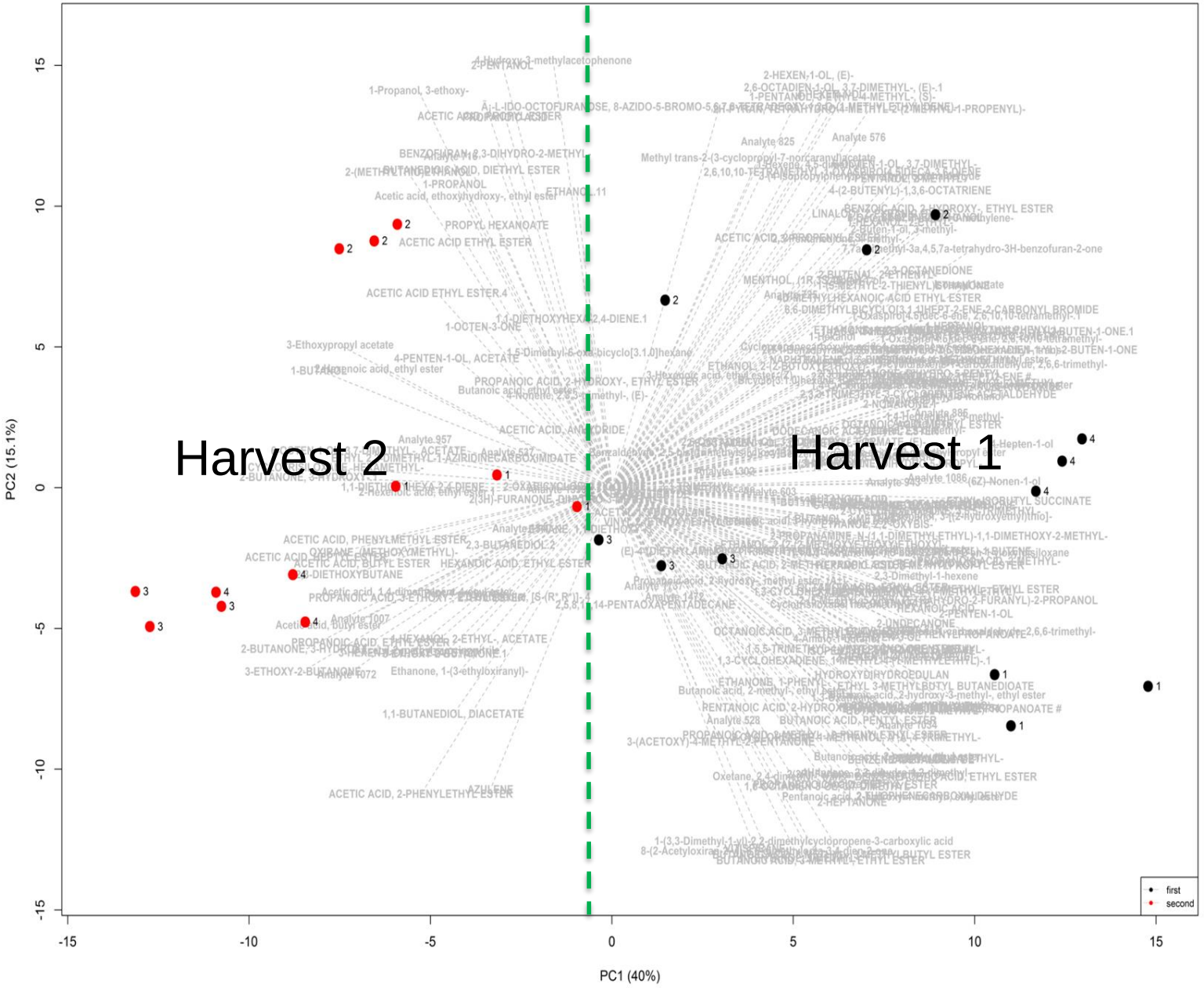
2. **Wine Polyphenols were less influenced by harvest date**

3. **Alterations in wine chemical composition were also perceived sensorially**

Suklje et al, 2019

ароматы - зрелые фрукты и ягоды

ароматы - свежие фрукты и ягоды



Разделение образцов вина с помощью анализа главных компонент на основе даты сбора винограда

1. Значительные изменения в 175 летучих компонентах вина в зависимости от даты сбора урожая, независимо от способа возделывания виноградника в рамках одного макроклимата.

2. Полифенолы вина были менее подвержены влиянию даты сбора урожая.

3. Изменения в химическом составе вина также ощущались сенсорно

Suklje et al, 2019

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DOI:10.20870/oeno-one.2021.55.2.4527

OENO One
VINE AND WINE OPEN ACCESS JOURNAL

Performing sequential harvests based on berry sugar accumulation (mg/berry) to obtain specific wine sensory profiles

Guillaume Antalick[1,2]*, Katja Šuklje[1,3], John W. Blackman[1], Leigh M. Schmidtke[1] and Alain Deloire[1,4]

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Associate editor: Fulvio Mattivi

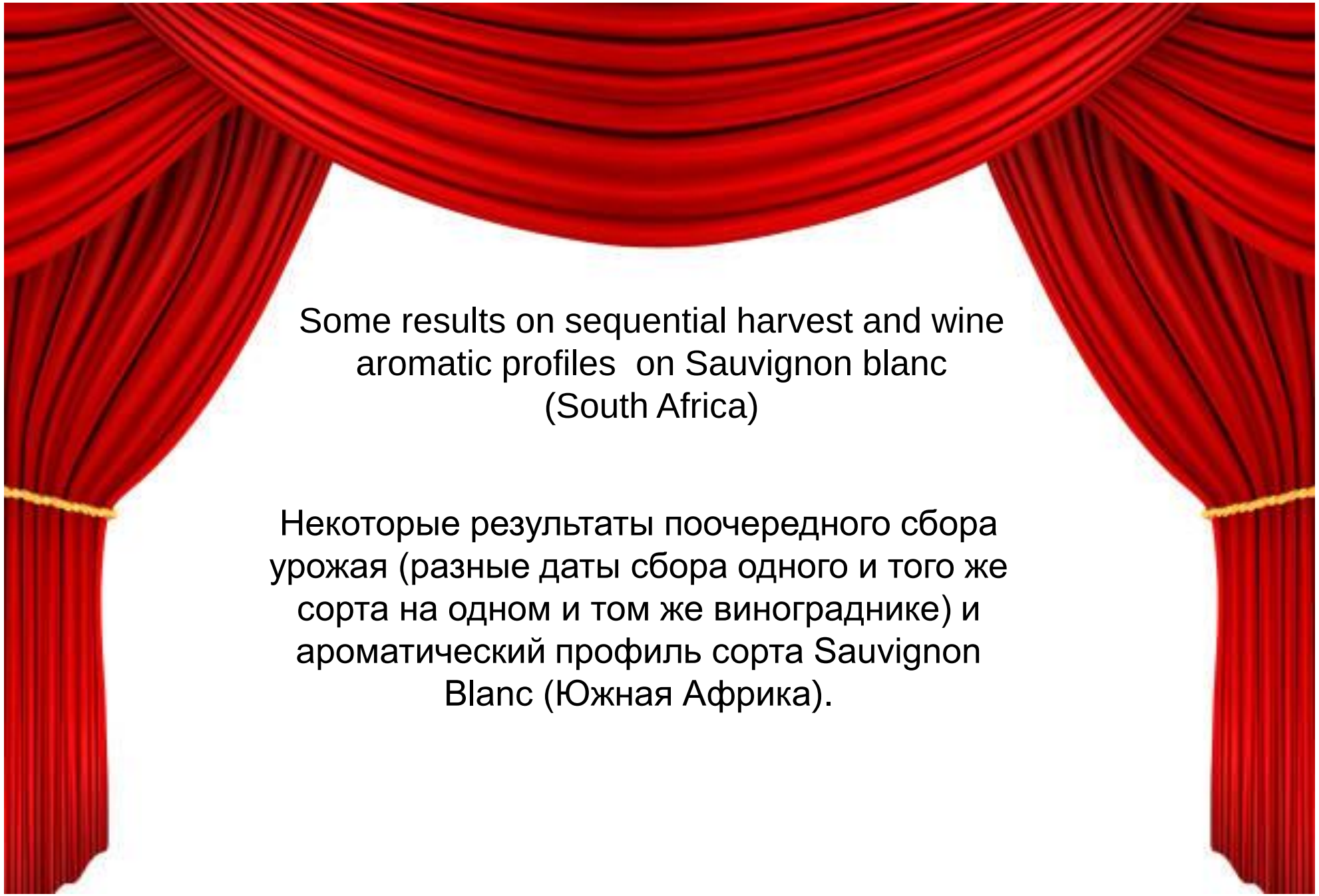
ABSTRACT

This study aimed to investigate the possible existence of reproducible aromatic red wine styles, focusing on fresh fruit aromas and mature fruit aromas (*i.e.*, with dark, jammy fruit characteristics) and taking into account both vintage and vineyard.

The study was performed on Australian Shiraz and Cabernet-Sauvignon from three different meso-climate areas and two consecutive vintages. Sequential harvests were carried out based on the plateau of the physiological indicator berry sugar accumulation (mg/berry) in order to obtain fresh fruit and mature fruit wine sensory profiles. There was a predictable aromatic sequence during grape ripening at each of these two distinct maturity stages regardless of grape genotype (variety) and environment (vineyard and vintage). The post-plateau period of berry sugar accumulation was found to be crucial for the evolution of wine aromatic profiles. During this period, wine aromatic and phenolic maturity were uncoupled from technological maturity (*i.e.*, berry sugar concentration). Dimethyl sulfide was found to be the most relevant wine aromatic marker for differentiating the fresh fruit and mature fruit stages irrespective of the variety. Specific cultivar markers with potential sensory contribution were also identified; for example, (Z)-3-hexenol, a possible contributor to the aromatic freshness of Shiraz wines from the fresh fruit stage. The evolution of terpenoids appeared to be separate from the dynamics of berry ripening post plateau of fruit sugar accumulation. On the other hand, ester composition was significantly altered during the same ripening period in Shiraz and Cabernet-Sauvignon wines with a marked grape genotype effect. The results showed that yeast metabolism was also affected by berry ripening evolution from the plateau of berry sugar accumulation onwards.

KEYWORDS

grape maturity, wine style, wine aromas, berry sugar accumulation


Some results on sequential harvest and wine aromatic profiles on Sauvignon blanc (South Africa)
Некоторые результаты поочередного сбора урожая (разные даты сбора одного и того же сорта на одном и том же винограднике) и ароматический профиль сорта Sauvignon Blanc (Южная Аффрика).

Sauvignon blanc

Altydgedacht1

pH: 3.09
TA: 10.86
20.7°B

Altydgedacht2

pH: 3.13
TA: 9.54
22.9°B

Altydgedacht3

pH: 3.16
TA: 9.17
22.8°B

Deloire A., Distell winery, 2011,

Campbell MEEKS

Dr John BLACKMAN

Guillaume ANTALICK

Dr Leigh SCHMIDTKE

Prof Alain DELOIRE

Dr Katja ŠUKLJE

Thank you
for your attention

Благодарим за внимание!

www.grapevine-paradise.com