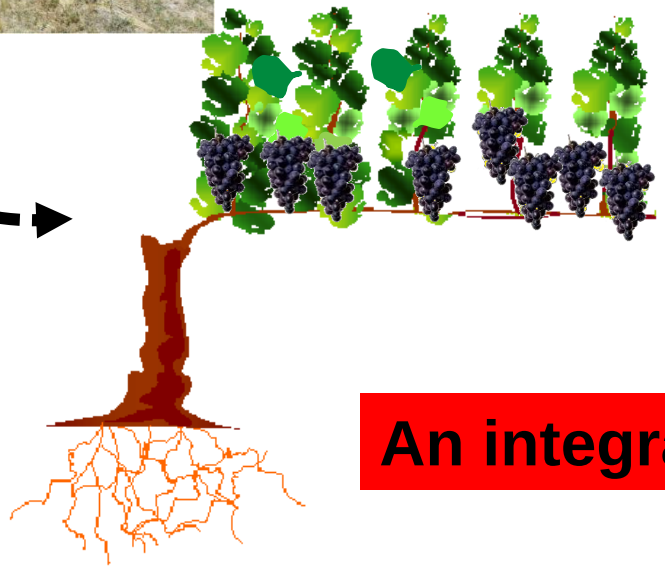
Grapevine berry ripening and wine style: How to manage the harvest date?

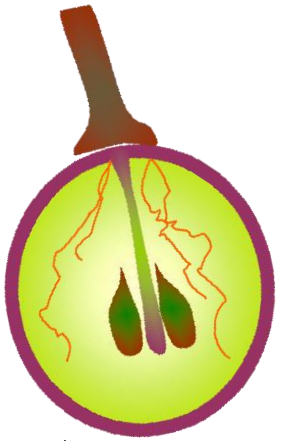
Alain DELOIRE[1,2], Katja ŠUKLJE[1,3], Guillaume ANTALICK[1,3], John BLACKMAN[1,4], Leigh SCHMIDTKE[1,4]

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

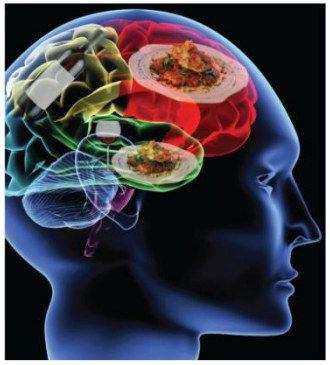
Ningxia, NWF&A University - April 2017

From the vineyard to the wine and sensory: how to capture the complexity?





An integrated approach



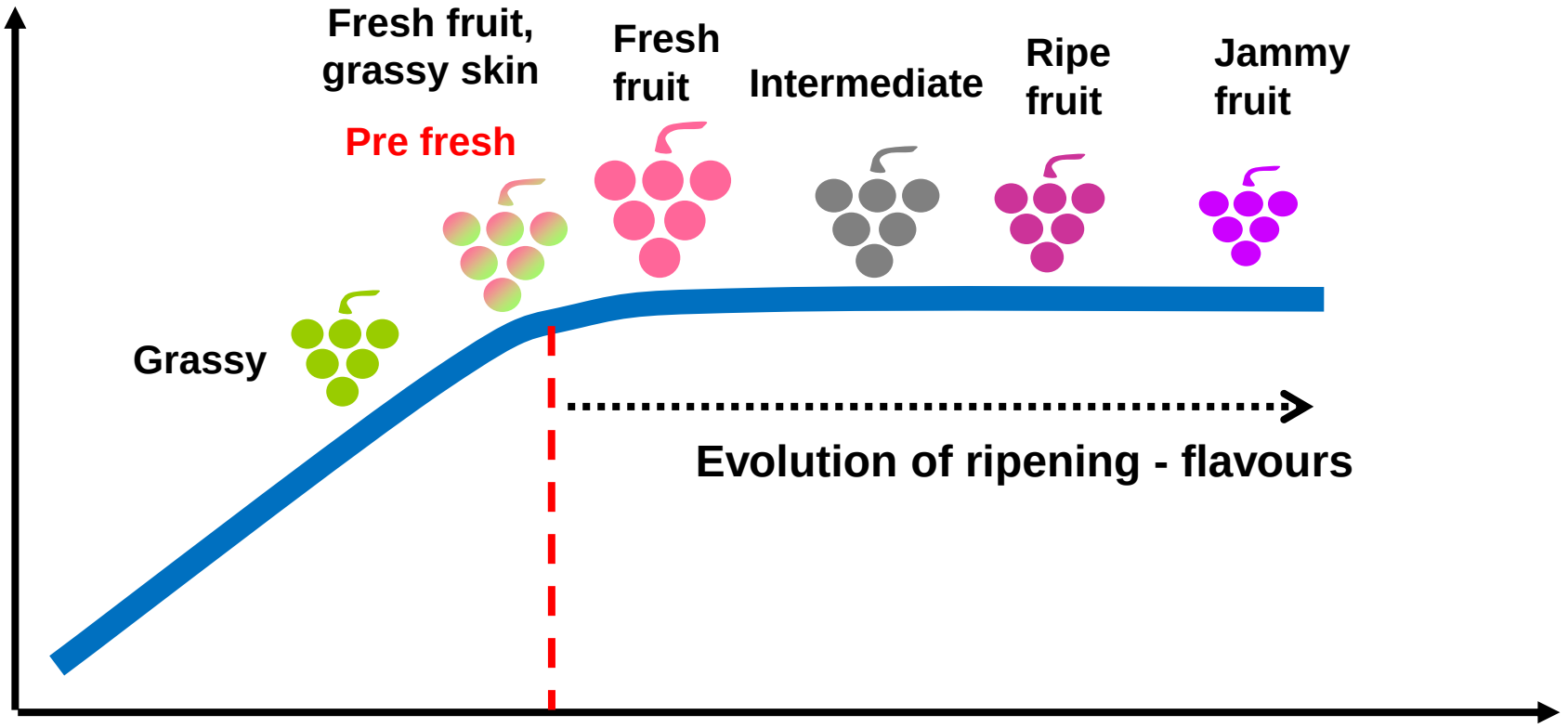
What will be presented today

- 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
    - Shiraz berry and wine composition
    - Shiraz sensory analyses
- Take home messages

Red cultivars: Berry Aromatic evolution over ripening. To set the scene…

Ripening levels

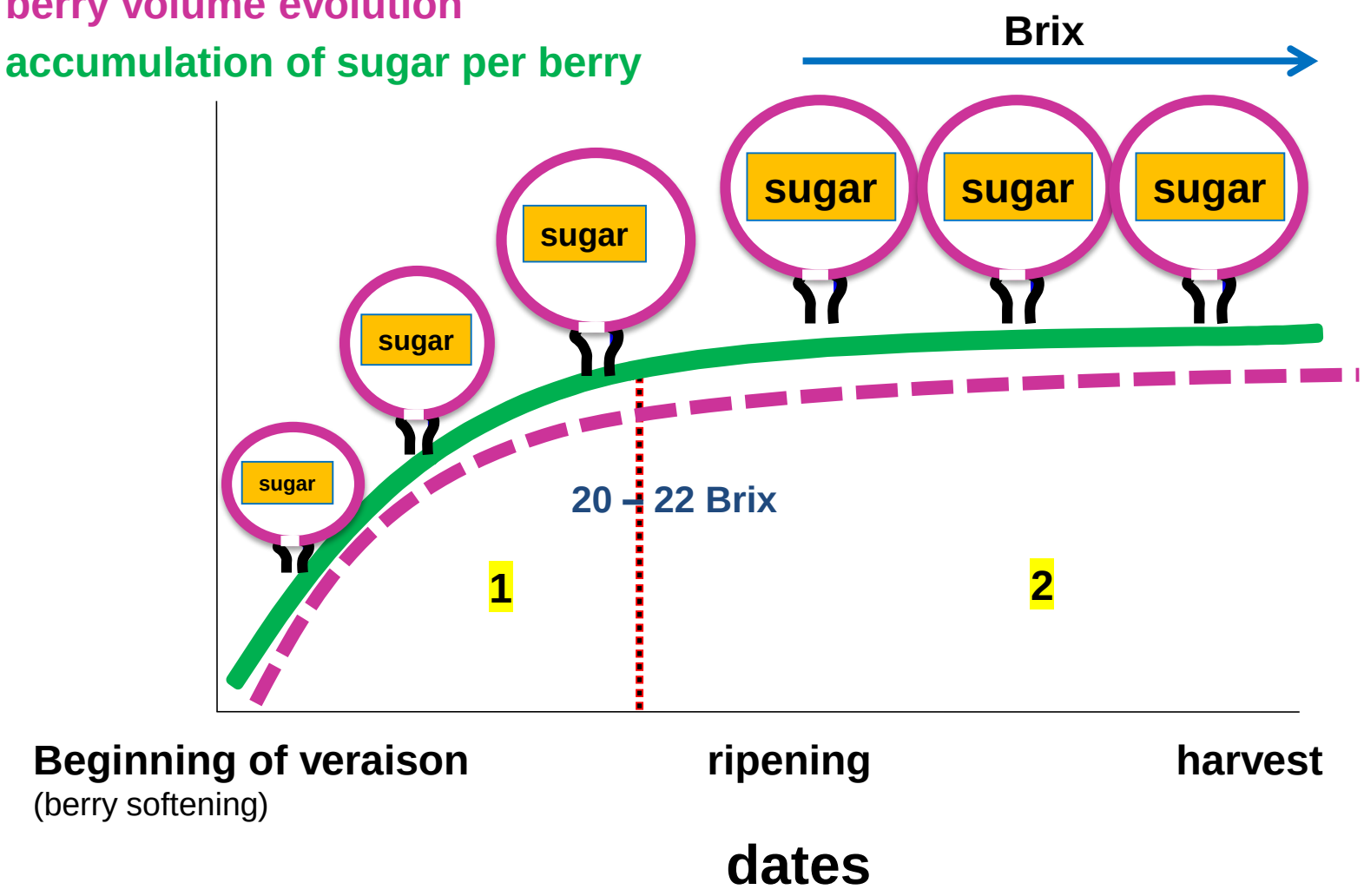
and sugar loading



Tempo of berry ripening according to a physiological clock and therefore possible style of wine able to be predicted. Not directly linked to Brix/Baume?.

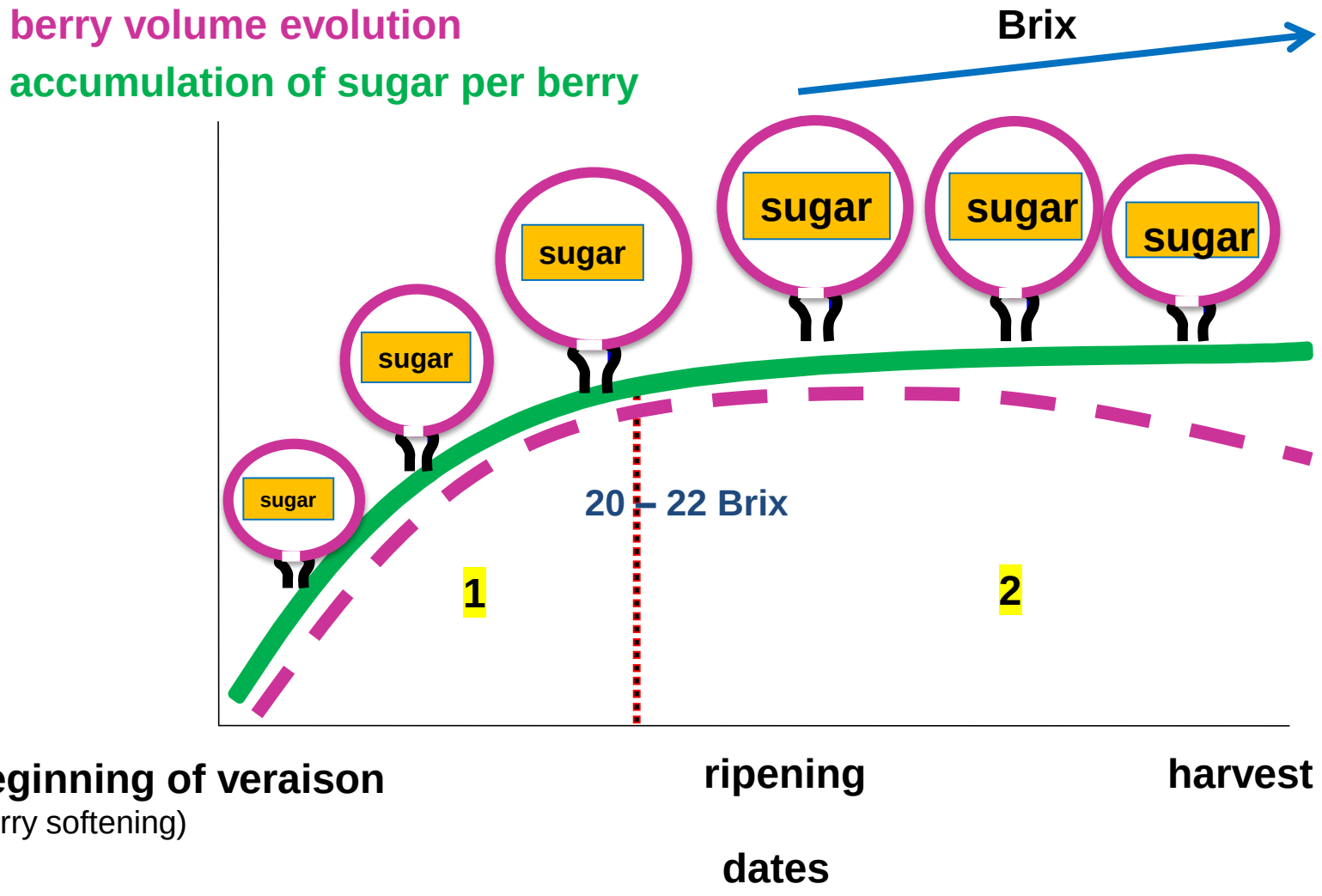
Vivelys, Deloire 2008, 2013

Berry sugar accumulation – berry volume and Brix



A. Deloire, 2009

Berry sugar accumulation – Berry volume and Brix



When sugar per berry reaches a plateau, the volume of the berry could decrease due to water loss and therefore the Brix will increase.

A. Deloire , 2009

When to harvest?

- **<u>Traditional indicators</u>**: *Baume, TA, pH, colour, grape berry sensory evaluation* = perception of the wine in the mouth (*non volatile matrix*).

- **<u>New indicators</u>** related to possible wine aromatic profiles (*volatile matrix*).


WINE REGIONS OF
NEW SOUTH WALES
Wine Australia
QUEENSLAND
NEW ENGLAND AUSTRALIA
Lismore
Coffs Harbour
Port Macquarie
SOUTH AUSTRALIA
RIVERINA
ORANGE
COWRA
Richmond
2h
4.5h
Sydney
MURRAY DARLING
SOUTHERN HIGHLANDS
Wollongong
CANBERRA DISTRICT
GUNDAGAI
Nowra
Canberra
ACT
SHOALHAVEN COAST
SWAN HILL
TUMBARUMBA
PERRICOOTA
Albury
VICTORIA
Wagga Wagga
www.wineaustralia.com

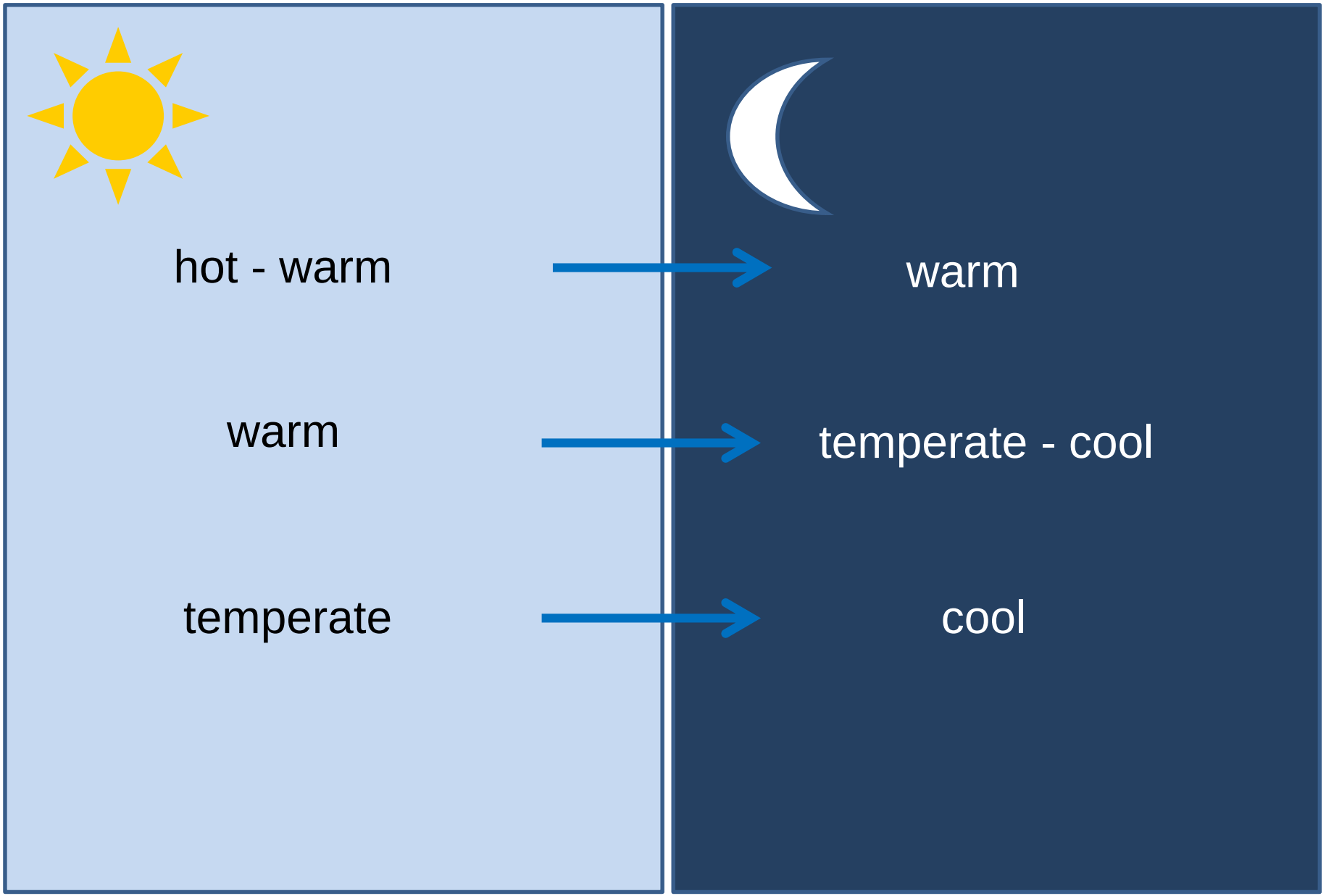
Mechanical pruning – Drip irrigation

Griffith (Riverina, NSW Australia)

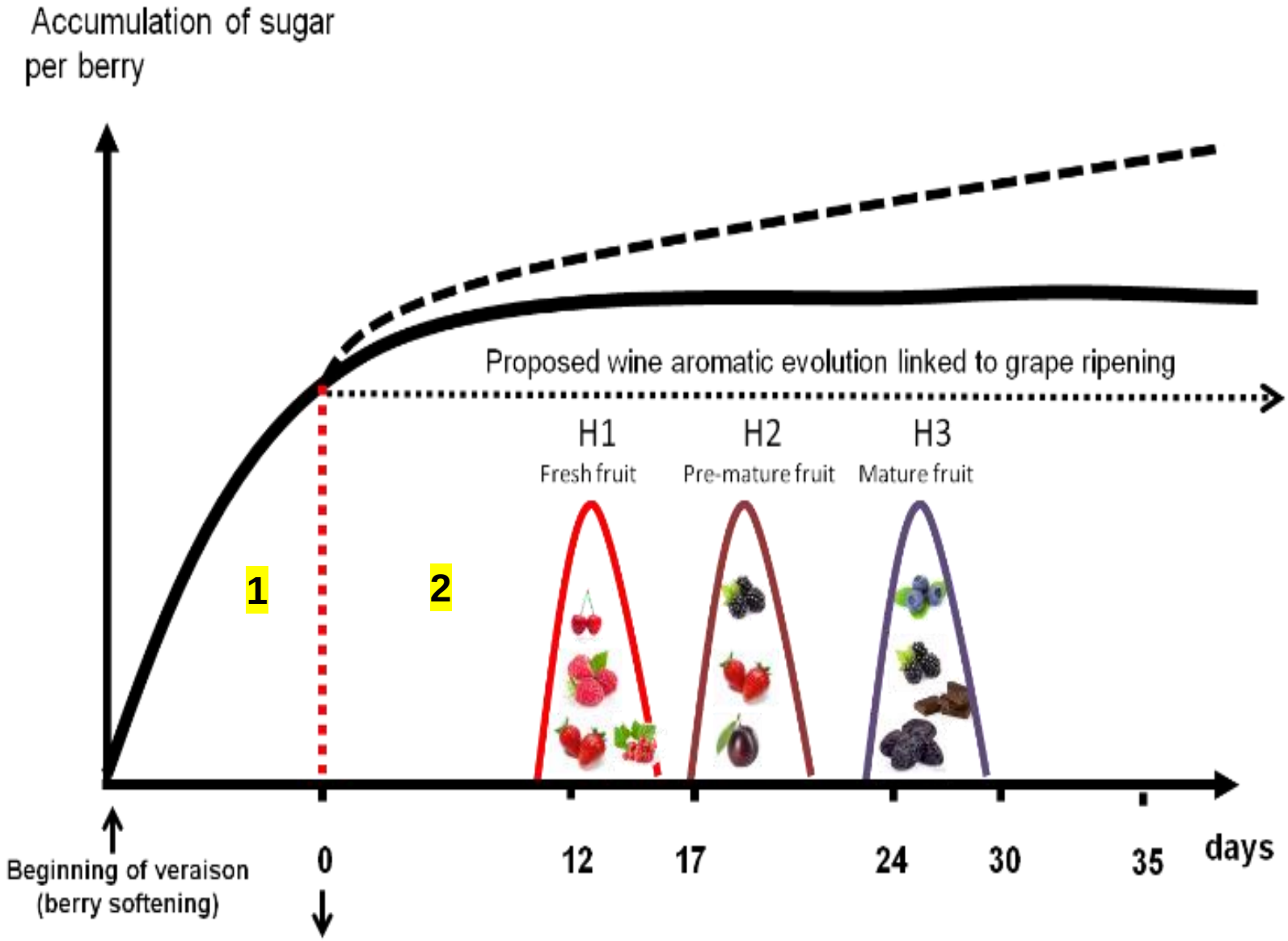
Sprawling training system

Light penetration under the canopy : sprawling training system

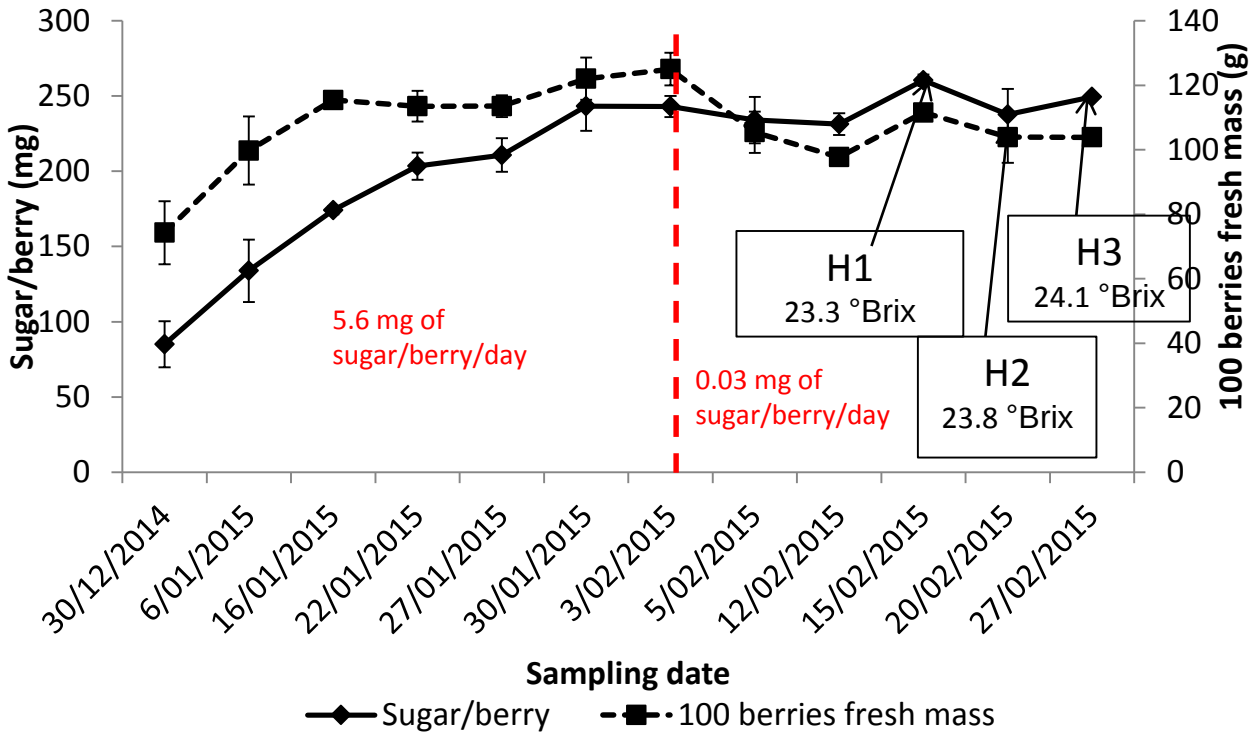
Day and night temperature and link to wine styles?



Proposed ripening sequence for Shiraz



Berry sugar accumulation and volume evolution (Shiraz-Griffith)

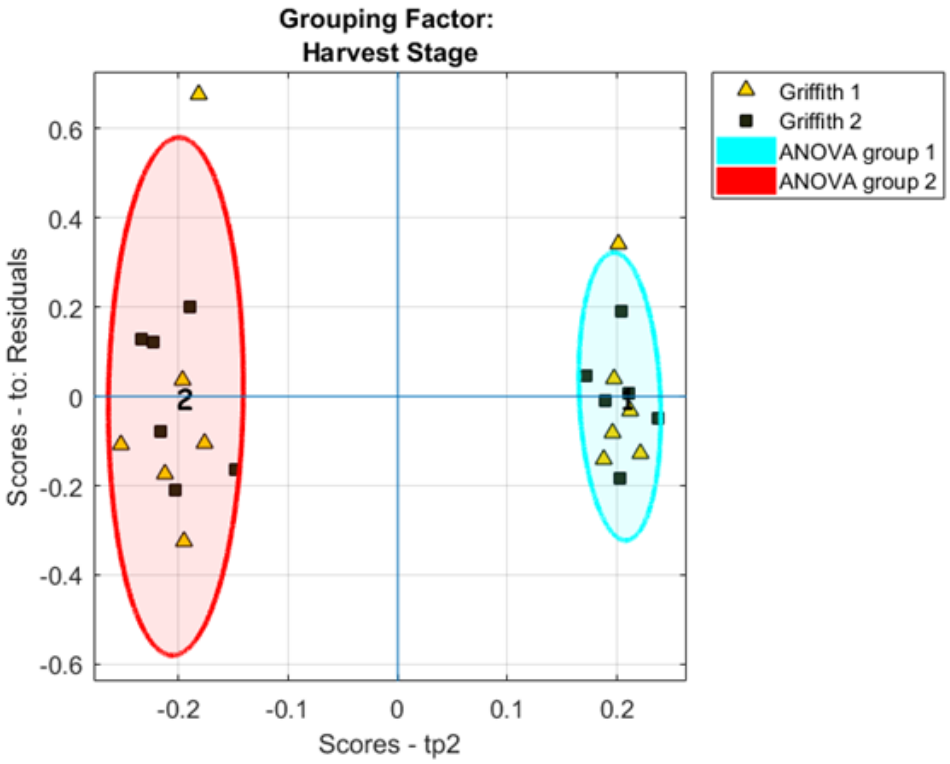


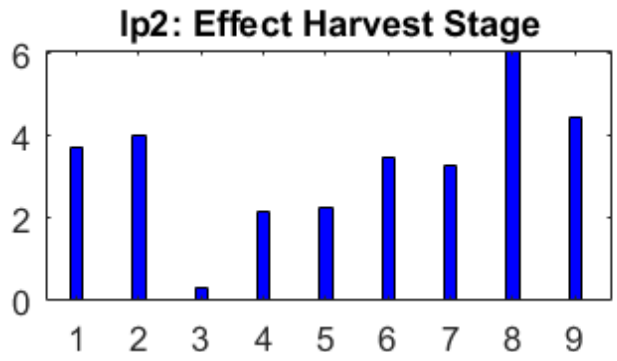
Harvest dates	Predicted	Harvested	Commercial harvest date
Plateau	3.2.2015		
H1: Fresh fruit	15.2.2015	15.2.2015	6.3.2015
H2: Intermediate stage	21.2.2015	20.2.2015	
H3: Mature fruit	27.2.2015	27.2.2015	

Basic juice and wine parameters for the two vintages

		G1_2015	G1_2014
Juice TSS (°Brix)	H1	23.3b	22.5b
	H3	24.0a	26.8a
Juice TA (g/L)	H1	3.2a	5.37b
	H3	2.9b	3.33c
Wine Ethanol (% w/v)	H1	13.5a	12.8b
	H3	13.6a	15.4a

Clear separation of samples according to the harvest dates in Griffith for 2014 & 2015 vintage

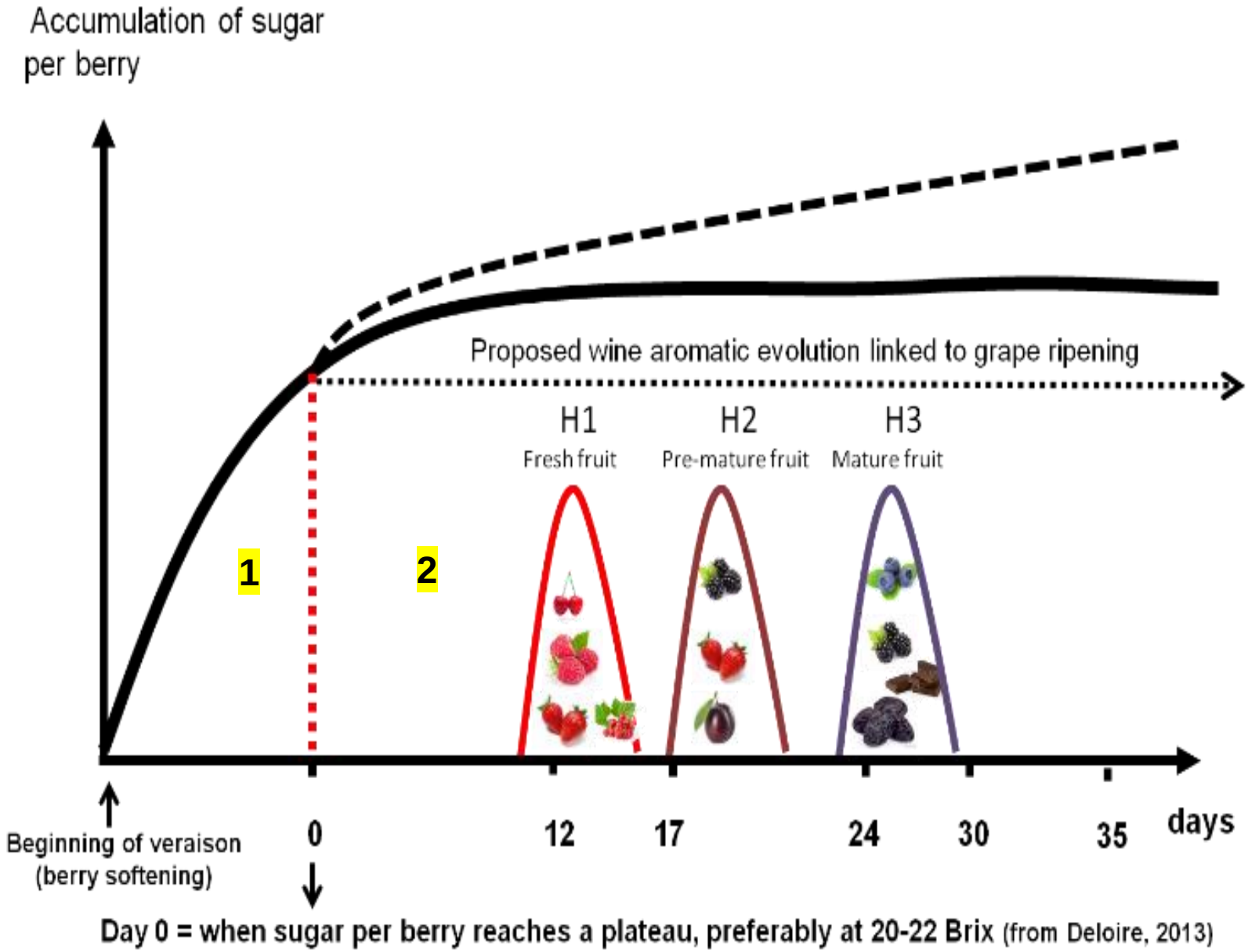




2014 and 2015 Griffith Shiraz; Separation of samples are made according to the harvest date. 1,2, refers to the harvest date 1 and 2, respectively. Ellipses represent 95% confidence interval for each ANOVA explanatory factor. Nine blocks of variables were used: (1) Grape amino acids; (2) Grape sugar and organic acids; (3) Grape anthocyanins; (4) Grape carotenoids; (5) Grape volatiles; (6) Juice analysis (Brix, YAN); (7) Wine colour, alcohols and organic acids; (8) Wine volatiles; (9) Wine sensory attributes

Wine volatiles and sensory attributes contributed at most to the separation of samples

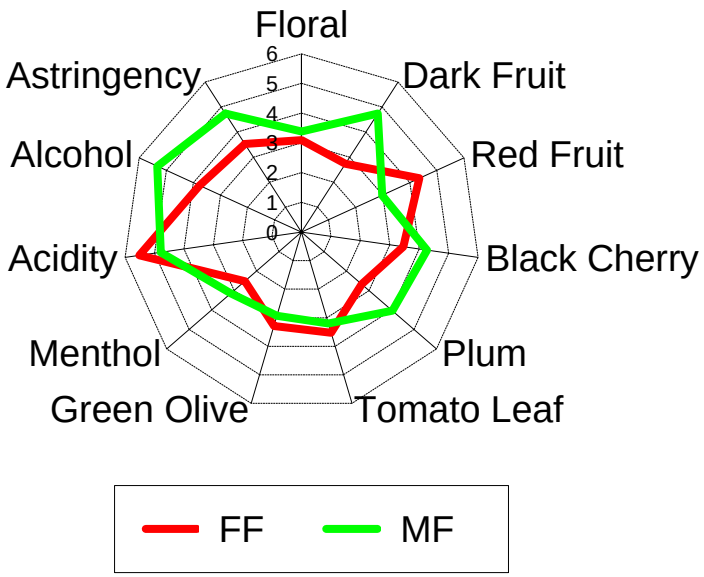
Proposed ripening sequence for Shiraz



Sensory analyses (Griffith)

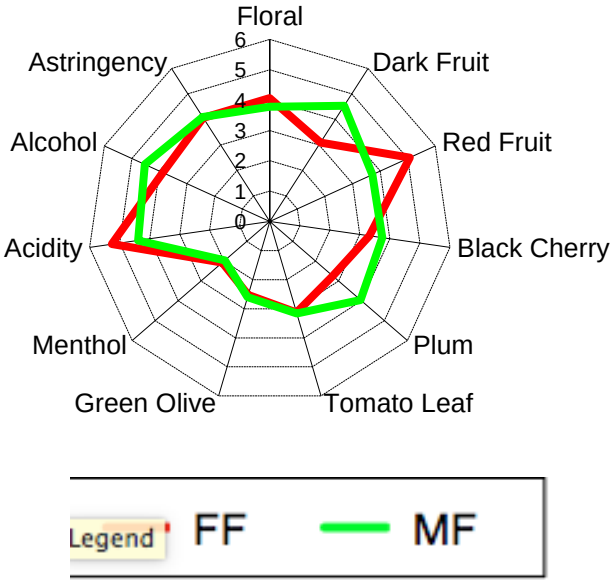
2014

G1



2015

G1



Wine markers of early harvest

C6-compounds

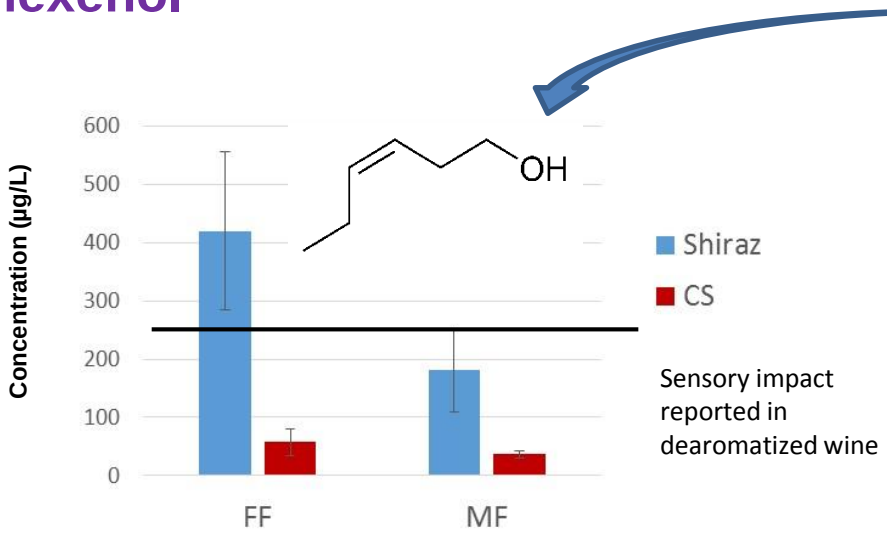
Hexanol

Trans-2-hexenol

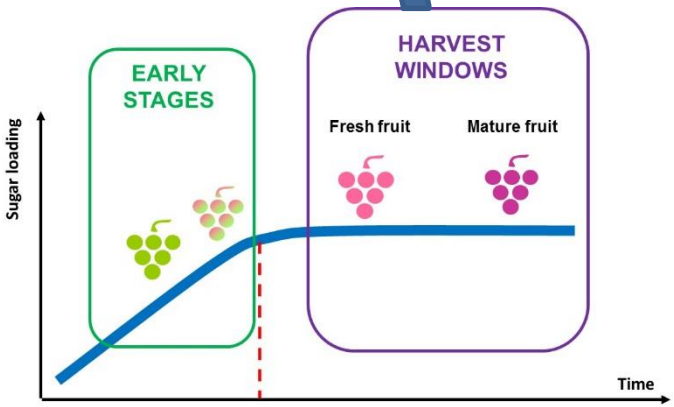
Trans-3-hexenol

Cis-3-hexenol

Herbaceous, grassy, fresh aromas

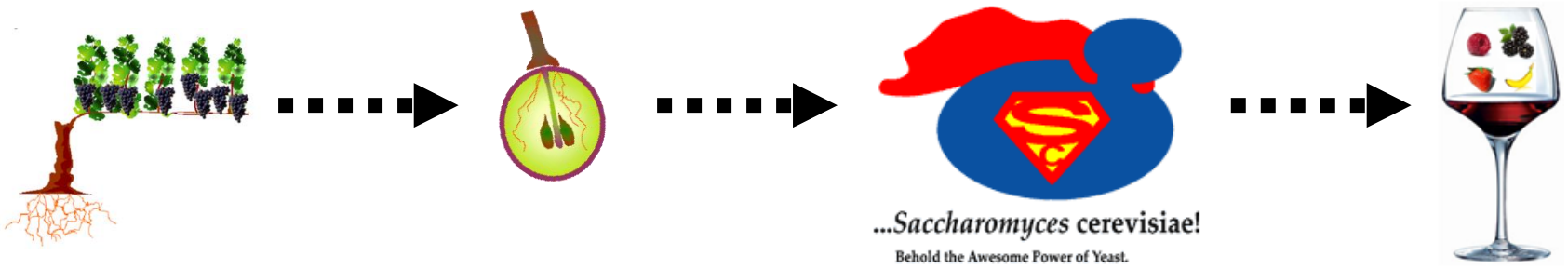


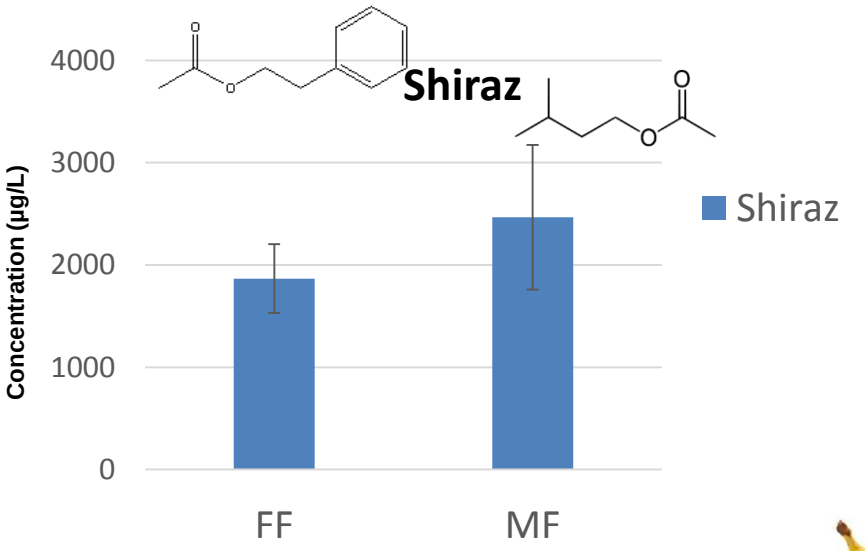
Sensory impact reported in dearomatized wine



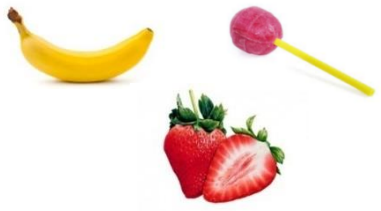
Cis-3-hexenol: marker of Fresh Fruit Shiraz

Grape maturity influences yeast ester metabolism





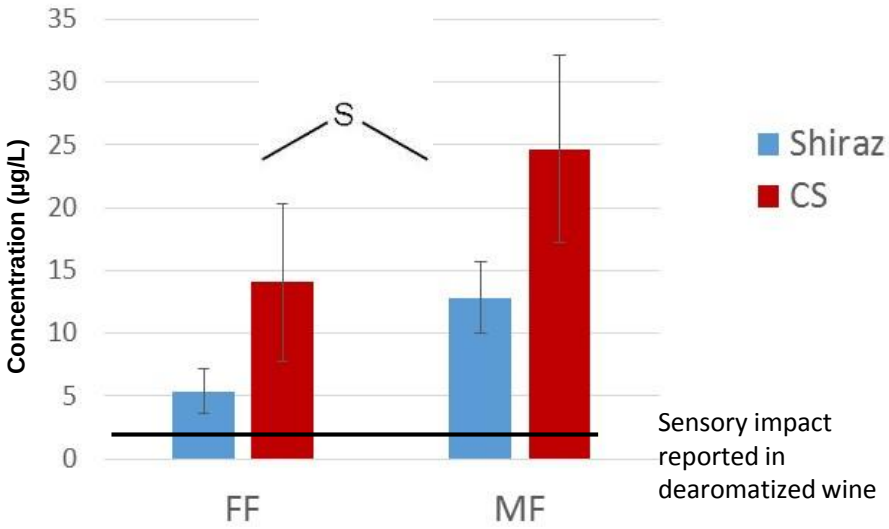
Higher alcohol acetates contents significantly increase with grape maturity in Shiraz wines



Fruity, confectionary aromas

Varietal Marker of Mature Fruit Stage

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



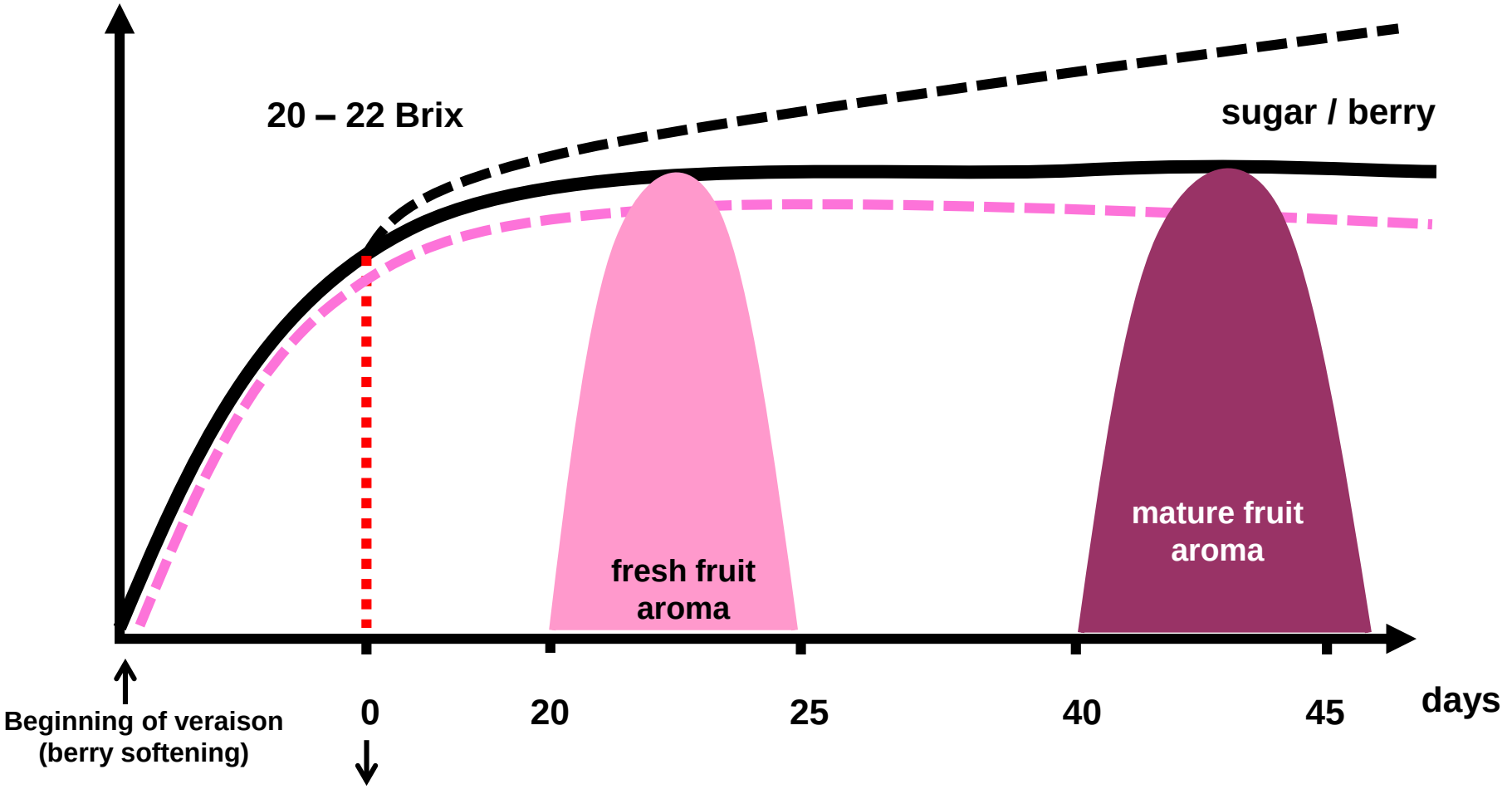
Dark fruit, stewed fruit, truffle

Dagan, 2006; Bindon et al. 2014

Cabernet Sauvignon tempo of ripening

berry volume evolution

accumulation of sugar per berry



Vivelys, Deloire 2008, 2012

Take Home Messages

The value of this research for the wine industry is that:

- i) from a single vineyard and variety, irrespective of:
  - region,
  - associated environment
  - and cultural practices,

  it is possible to produce **with consistency** different wine styles using sequential harvest**;**

- ii) there is no clear nexus between berry sugar concentration and flavours from when sugar per berry accumulation reaches a plateau or slows down.

Dr Guillaume ANTALICK

Campbell MEEKS

Dr John BLACKMAN

Prof Alain DELOIRE

Dr Leigh SCHMIDTKE

Dr Katja ŠUKLJE




NSW GOVERNMENT Department of Primary Industries

Thank you

Charles Sturt University

NEW SOUTH WALES wine

DE BORTOLI

Australian Government

Australian Grape and Wine Authority

Cumulus

McWILLIAM'S FAMILY WINEMAKERS

PHILIP SHAW ORANGE, AUSTRALIA

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