Summer and autumn, not winter, matter in dormancy of the grapevine

Physiology and Climate

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Rethink:-

- Dormancy in the context of the grapevine
- Climate in the context of phenology of the grapevine
- Regulation of the timing of budburst
- The range of problems associated with rising temperatures

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Definitions

Quiescence - a state of repressed cell division, relieved immediately on removal of source of repression

Dormancy - a developmentally entrained quiescence which is incompetent to respond to the external environment until certain pre-conditions have been met.

Dominance - quiescence induced by an external organ, usually an apex or a leaf

Acclimation - physiological changes at the cellular and organ level leading to enhanced tolerance of exposure to stress: heat, cold, or drought.

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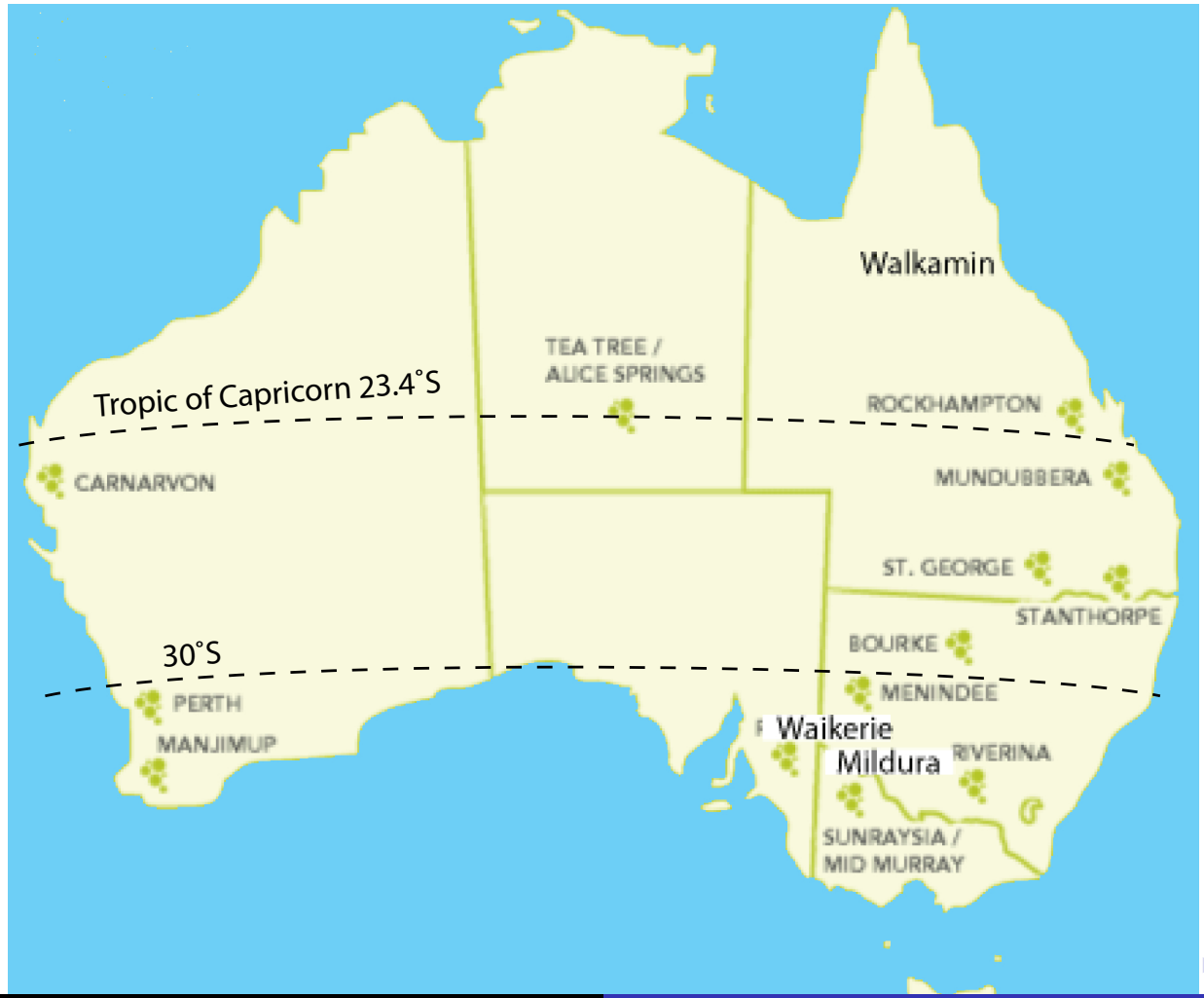
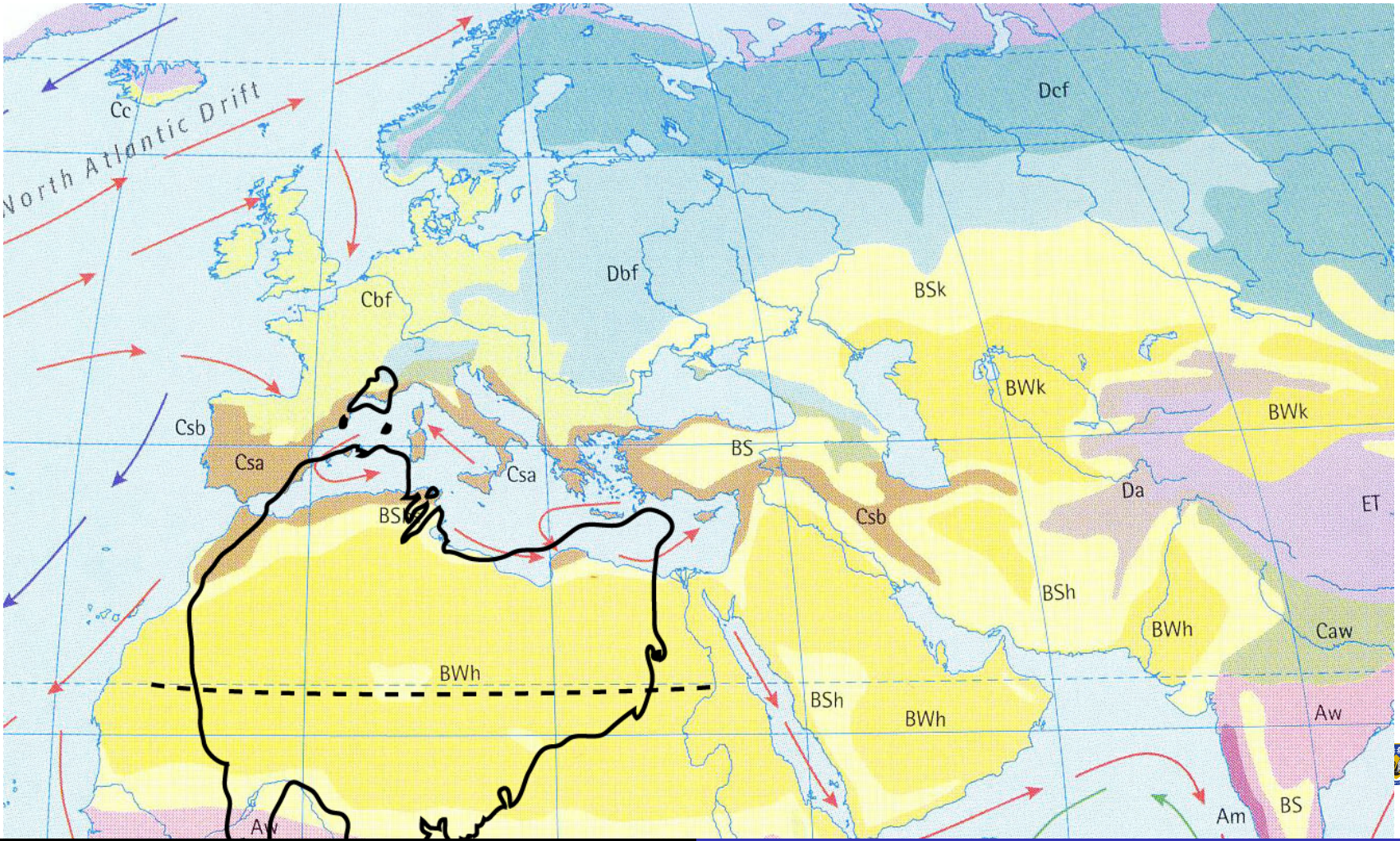
Down-under!


Walkamin
TEA TREE /
ALICE SPRINGS
Tropic of Capricorn 23.4˚S
ROCKHAMPTON
CARNARVON
MUNDUBBERA
ST. GEORGE
STANTHORPE
30˚S
BOURKE
MENINDEE
PERTH
Waikerie
MANJIMUP
Mildura
RIVERINA
SUNRAYSIA /
MID MURRAY

Down-under, Up-there

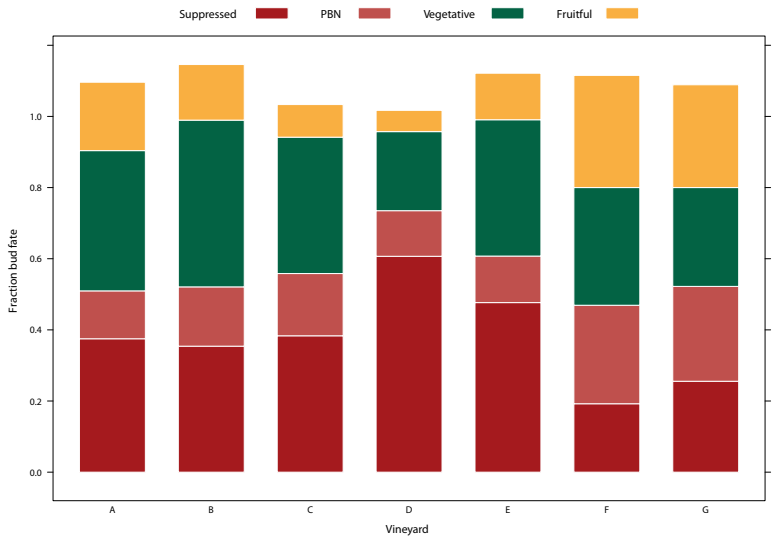


The Problems

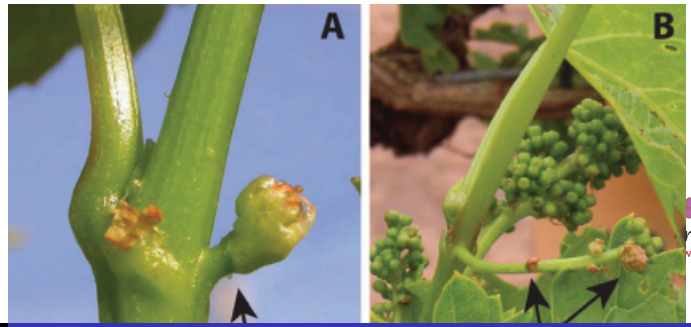
Depressed bud burst

Premature bud burst

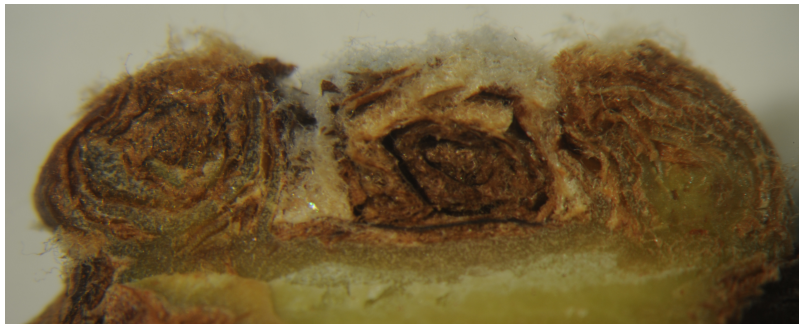
More Problems



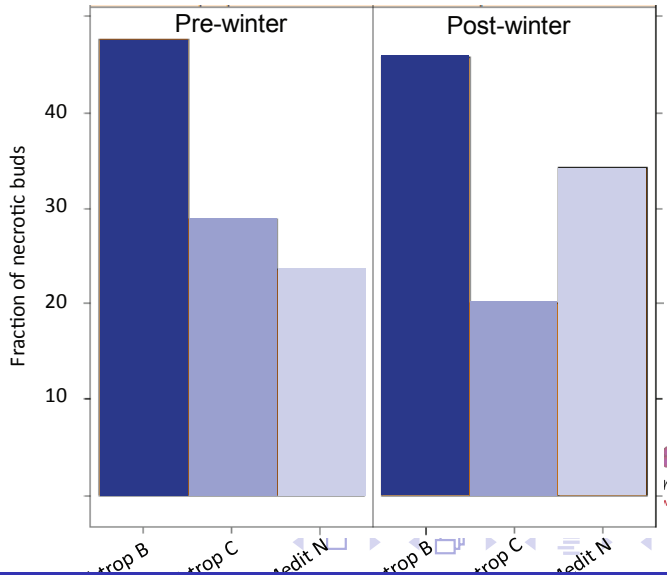
Risk to Yield and Quality



Yet More Problems

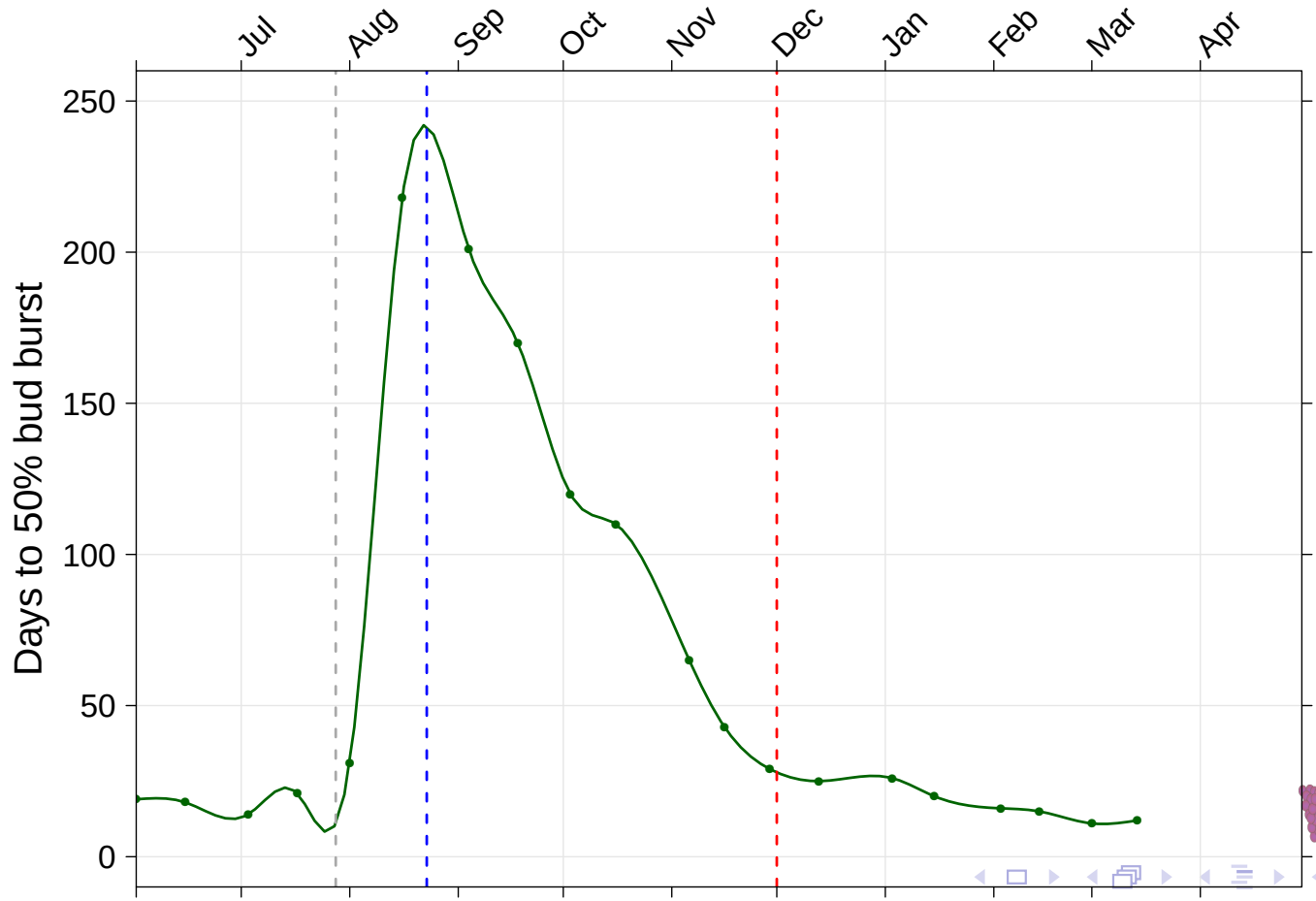


Primary Bud Necrosis

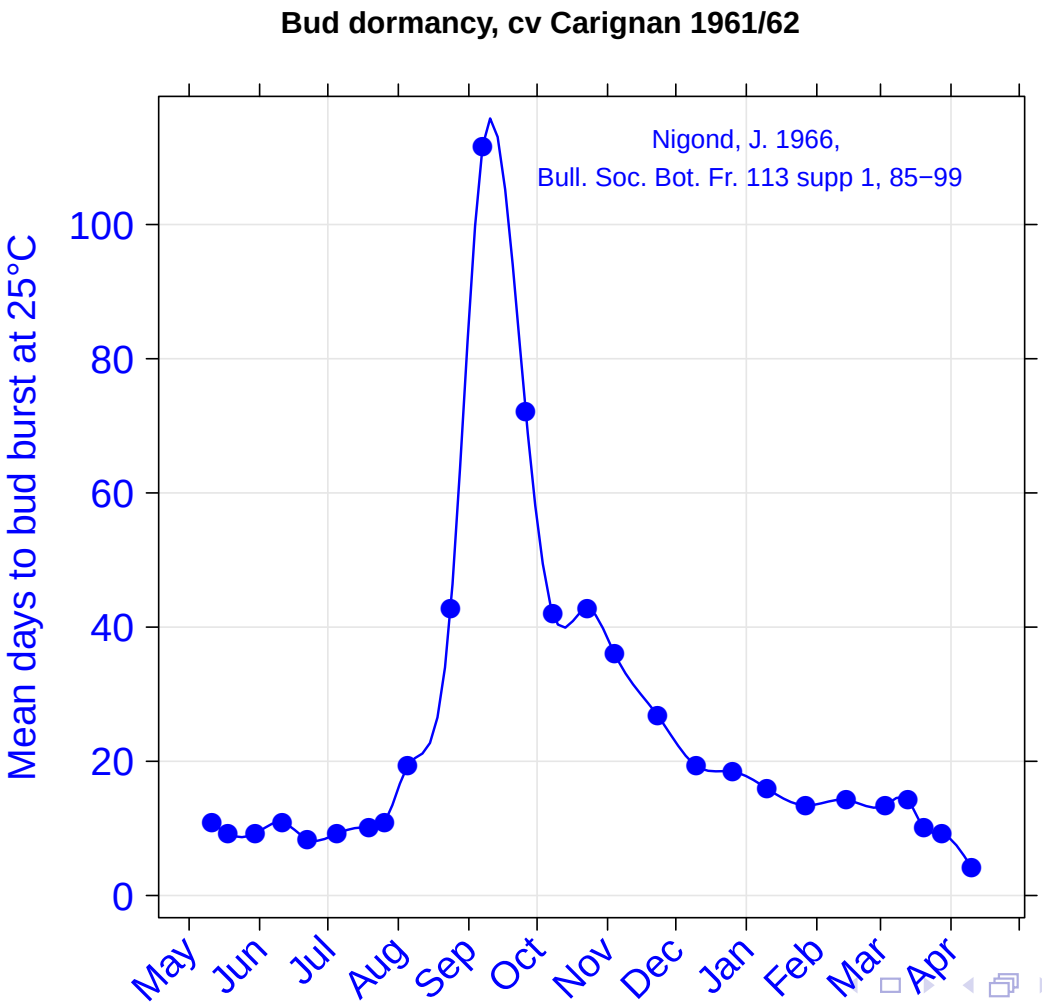


Prevalence of PBN

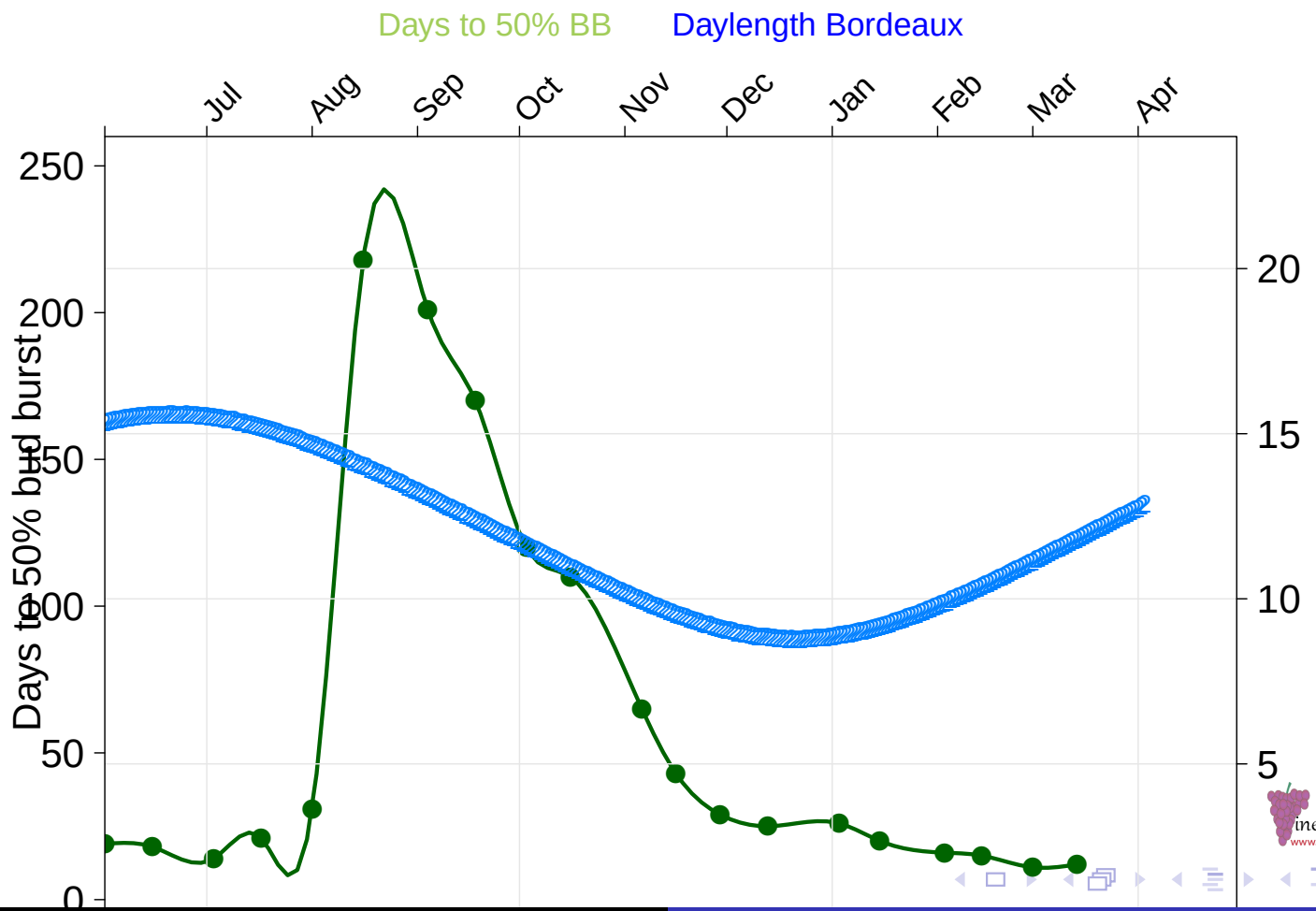
Bordeaux


Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
250
200
150
100
50
0
Days to 50% bud burst

Montpellier



Associated Phenomena



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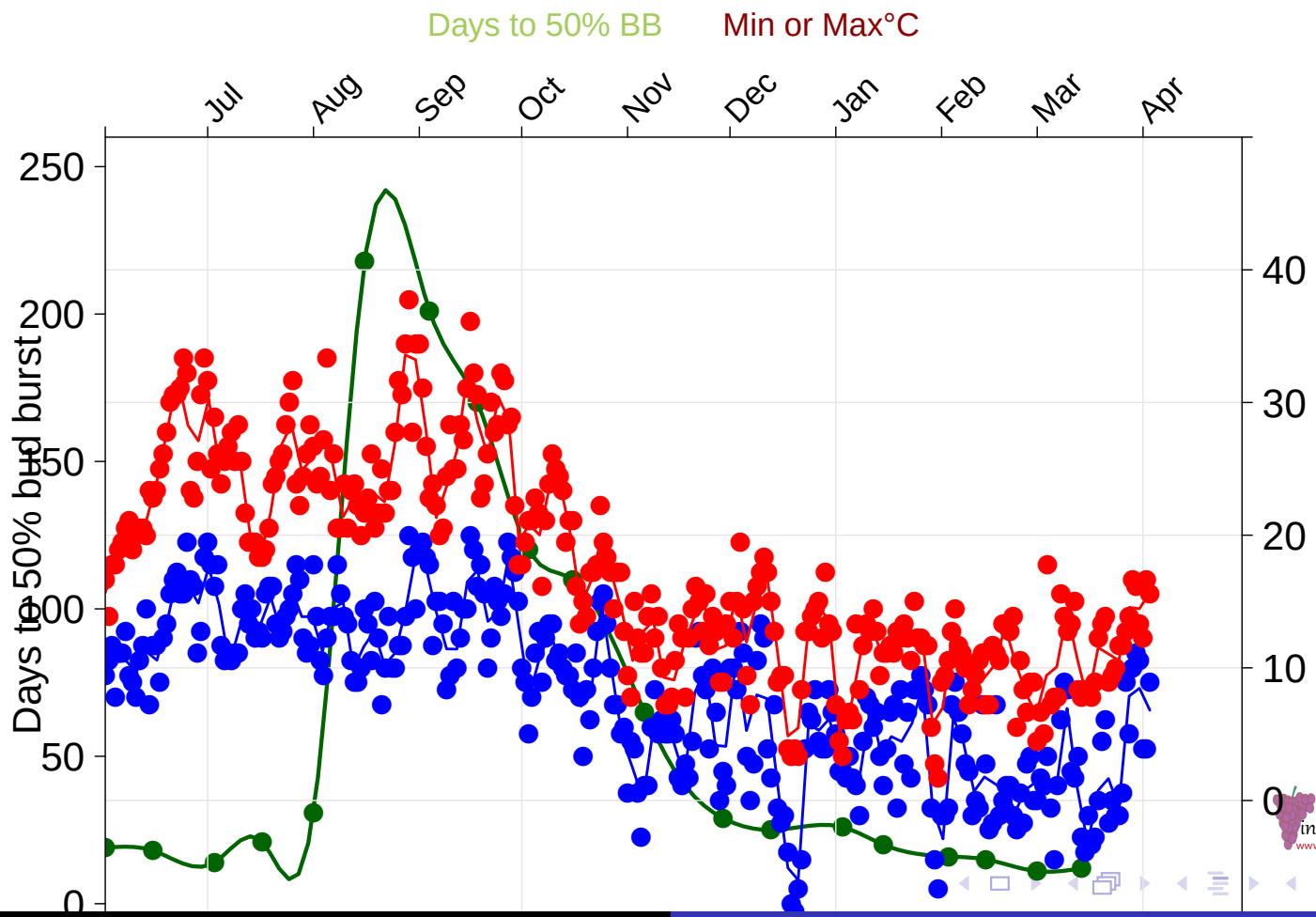

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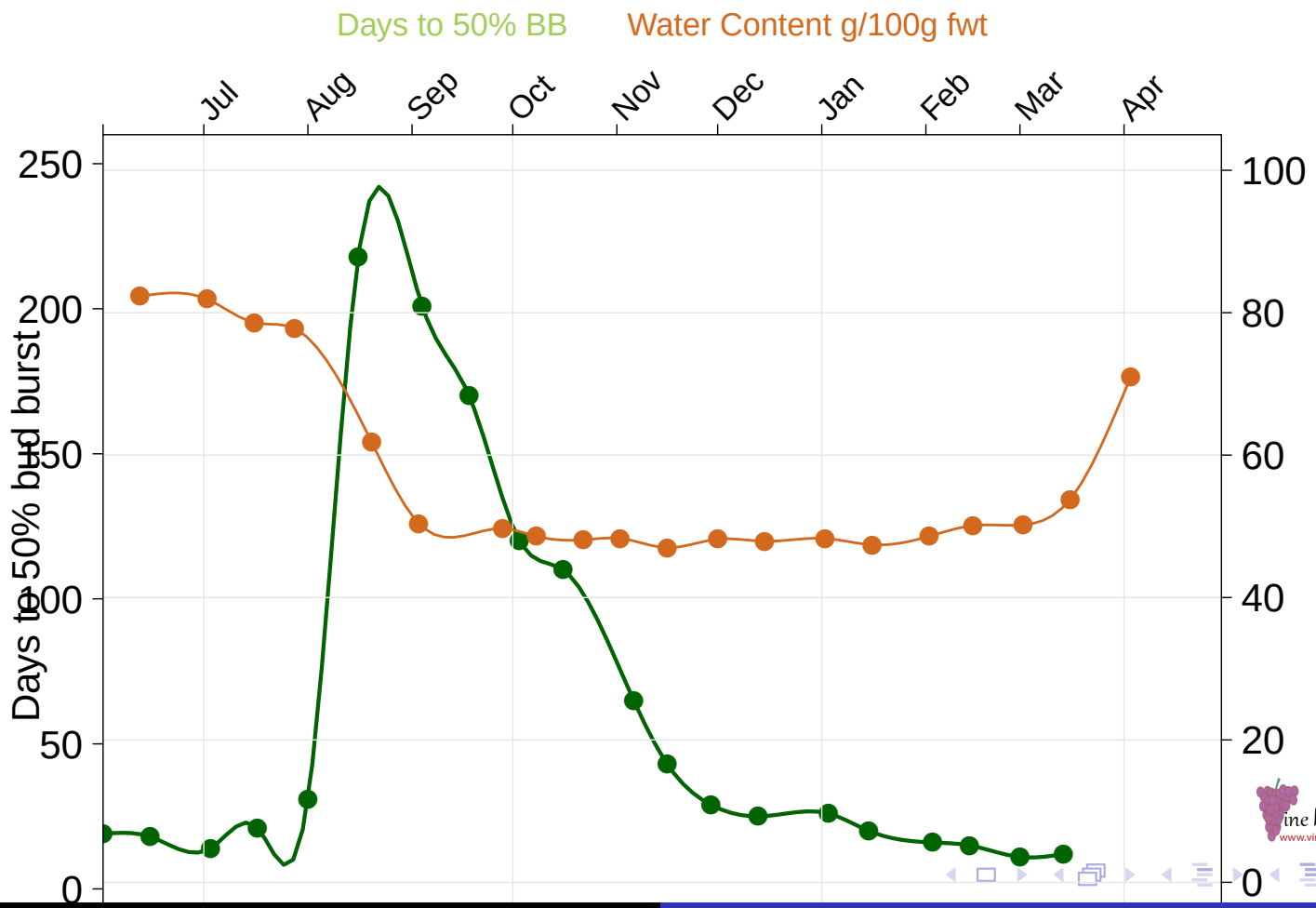


Chilling: Hours <= 10°C

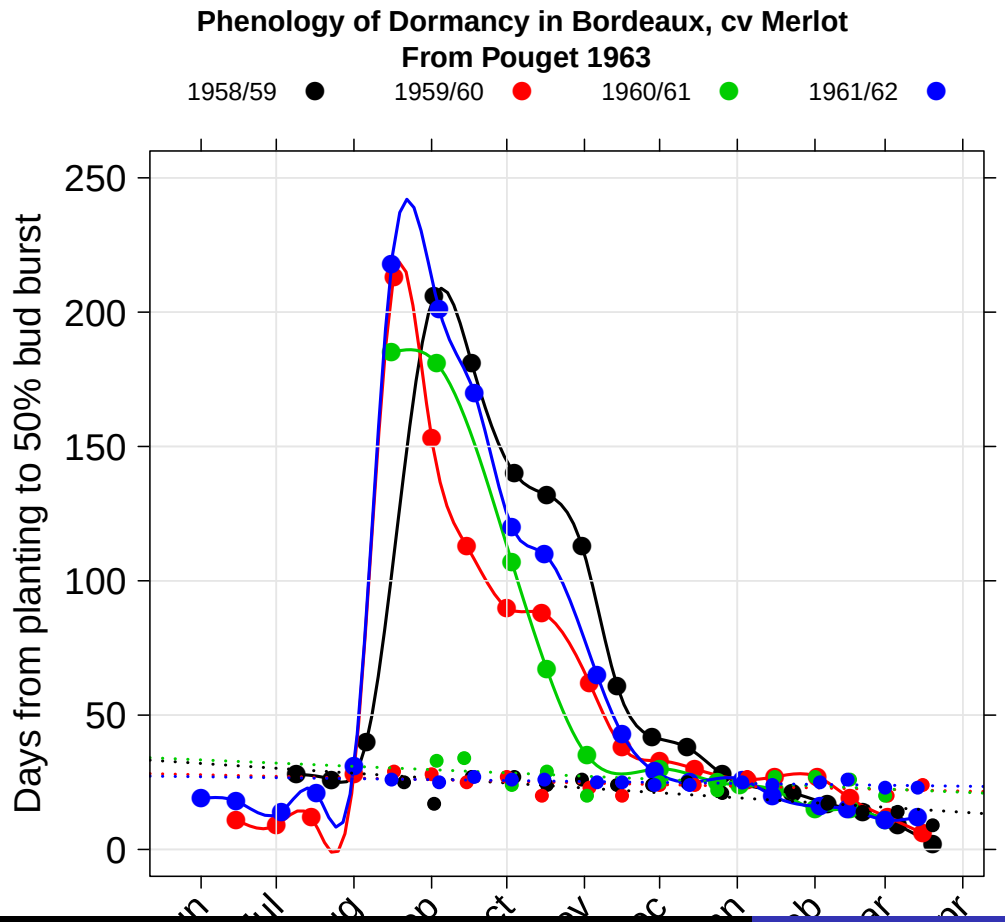


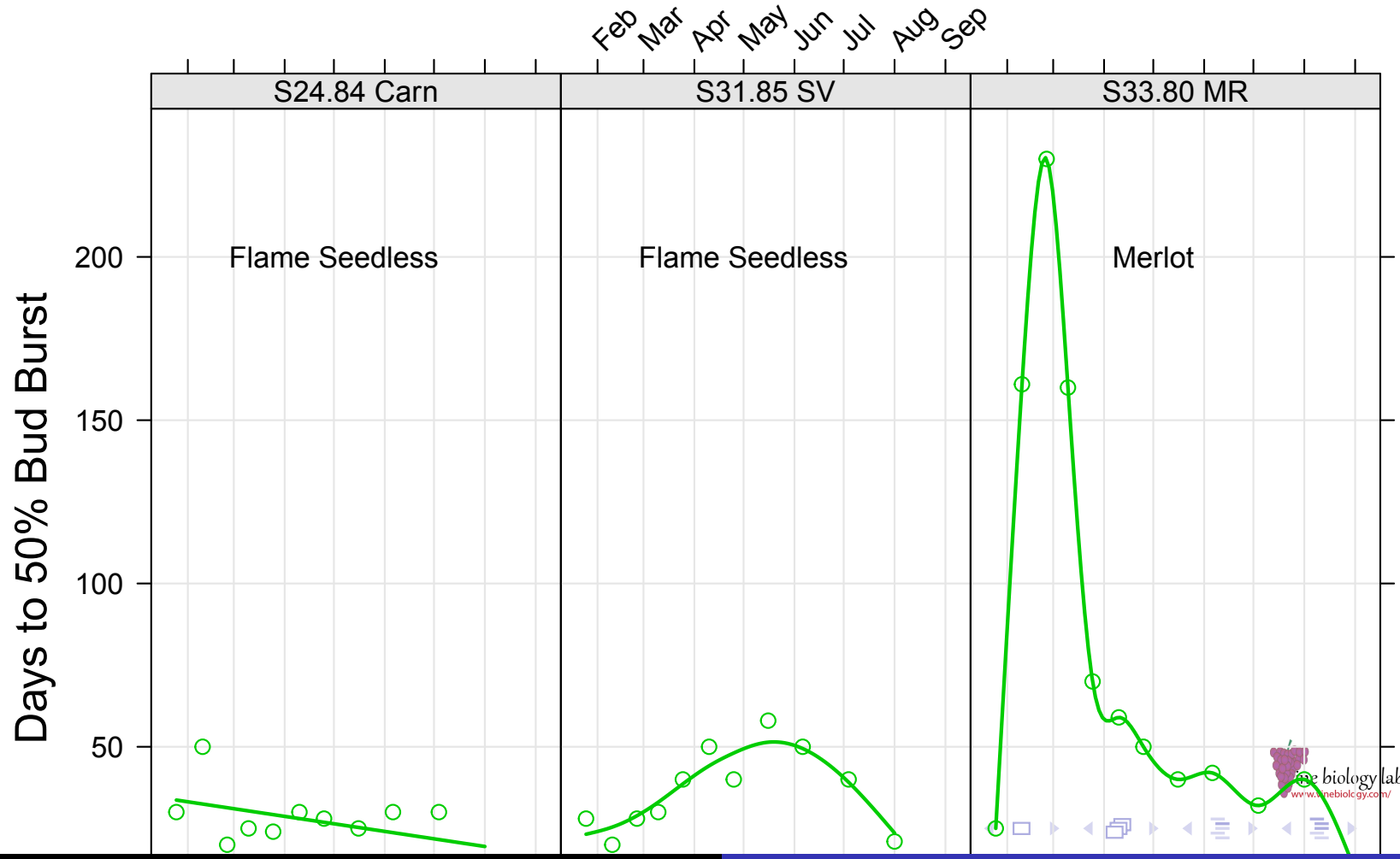
Table: *

Sum of hours $< 10^{\circ}$C from 1 August to the end of the 'dormant' phase [commencement of the post dormant phase], Pouget (1963) p 50

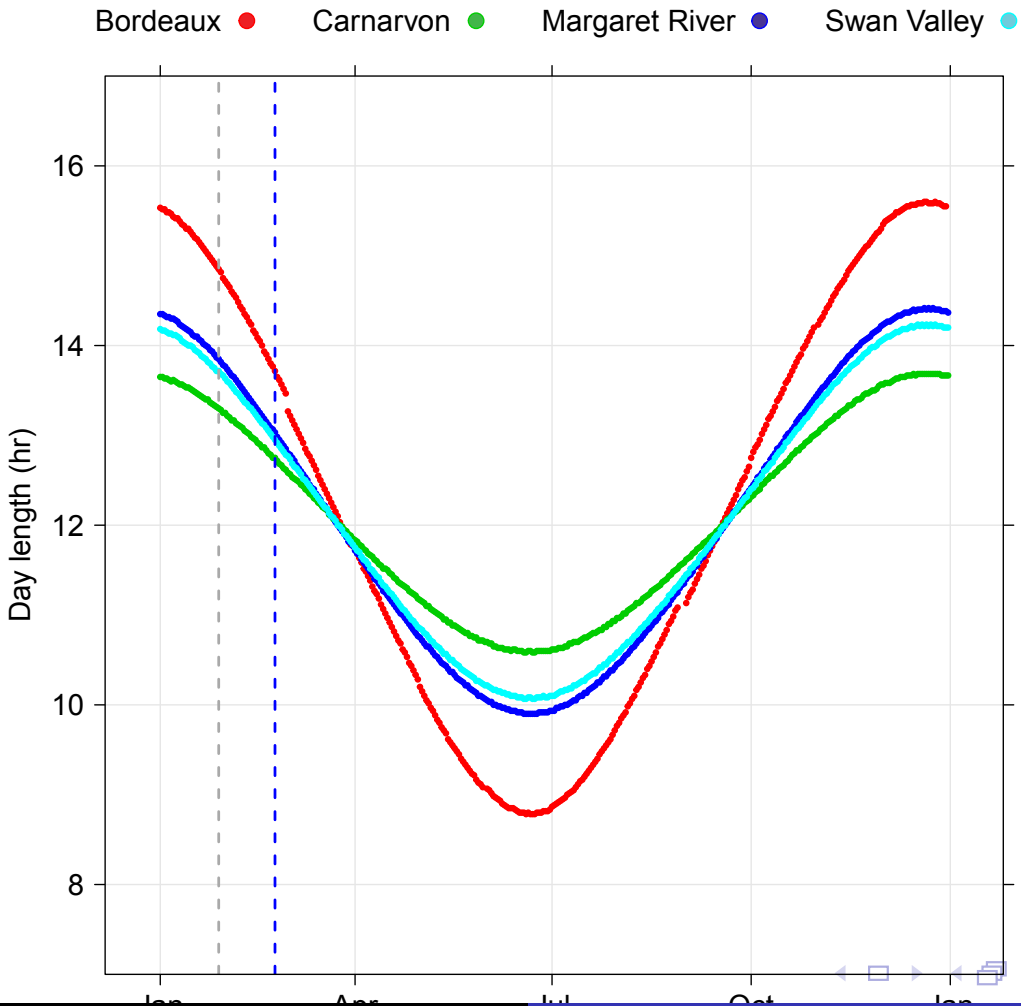
Growing Season	Hours $< 10^{\circ}$C
1958/59	616
1959/60	338
1960/61	180
1961/62	236

Pouget, R. Recherches physiologique sur la repos de la Vigne (*Vitis vinifera* L.: La dormance des bourgeons et le mécanisme de sa disparition. Annales de L'Amelioration des Plantes, 1963, 13 (Special Issue), 1-247

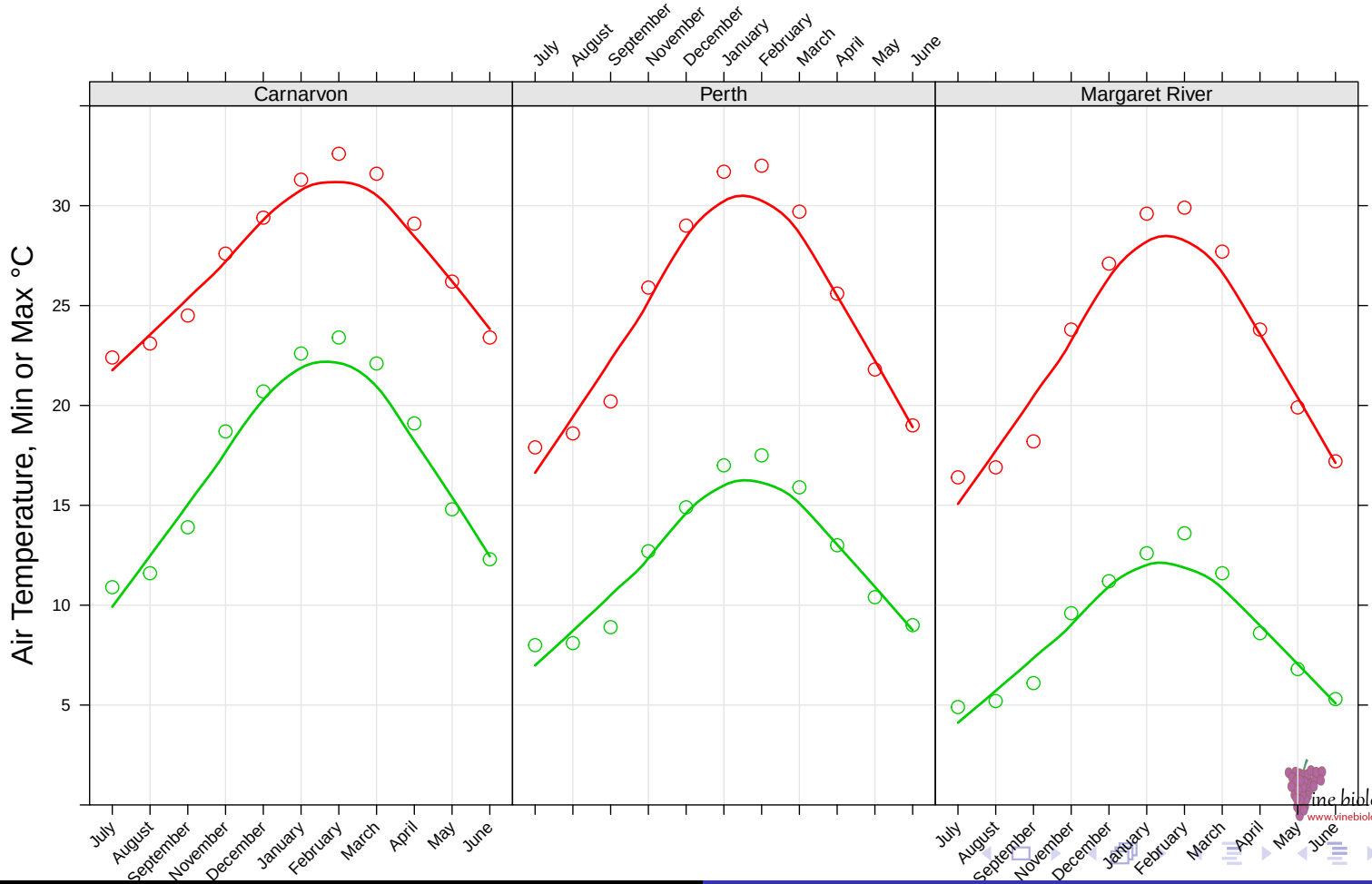
Resistance to Budburst; Cultivar & Location



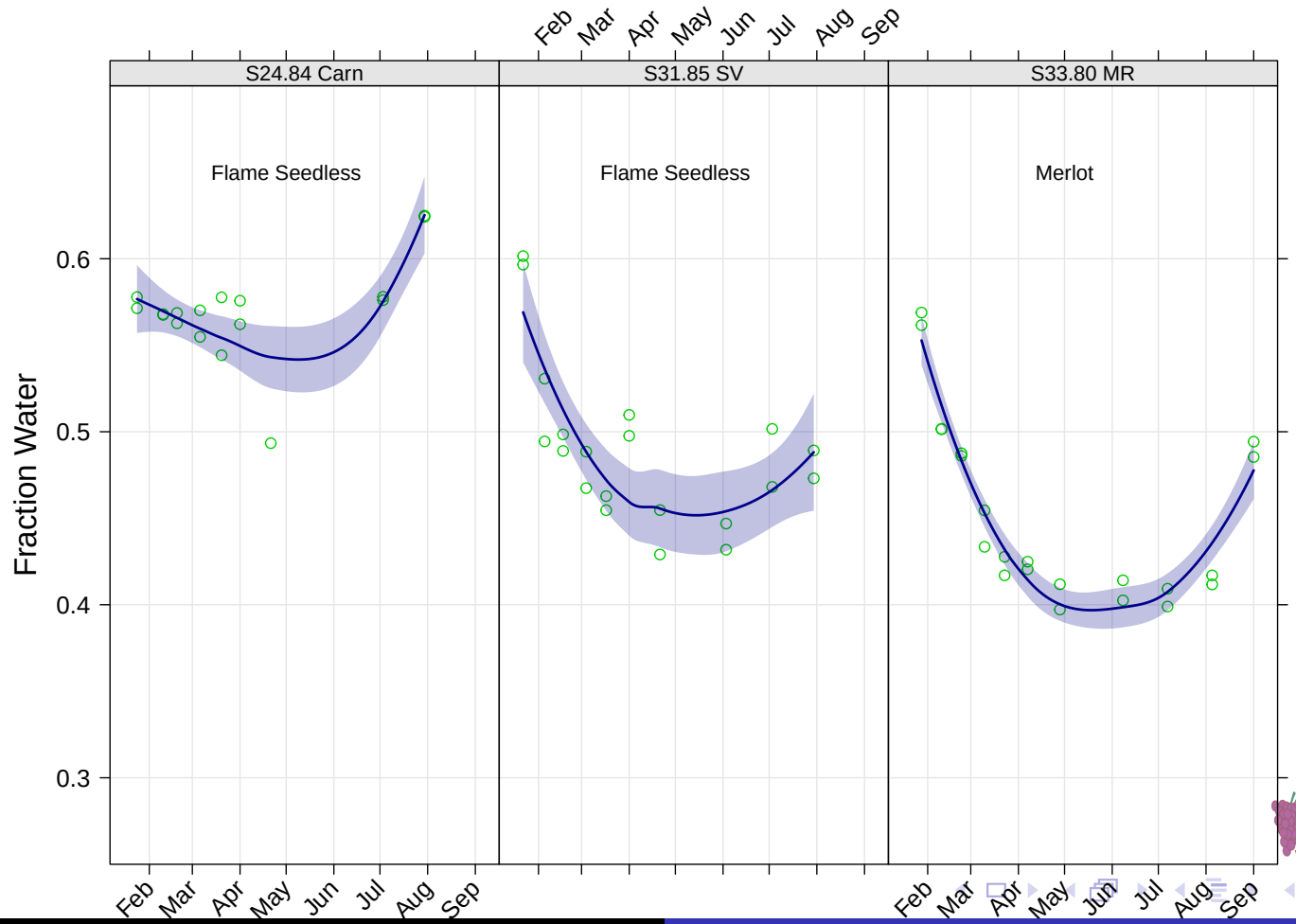
Solar Cycle


Bordeaux
Carnarvon
Margaret River
Swan Valley
Day length (hr)
16
14
12
10
8

Annual Thermal Cycle



Bud Moisture Content by Cultivar & Location



Summary

- Dormancy in *Vitis* is a 'summer/autumn' phenomenon
- Genetics are important Not all cultivars experience 'summer dormancy' but still resist bud-burst!
- Onset of dormancy appears to be a daylength related phenomenon
- Loss of dormancy in *Vitis* seems not to be a chilling hours phenomenon
- Bud burst timing seems unrelated to dormancy status.
- Desiccation may be a better measure of bud state than days to bud burst (but not in the subtropics?)

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Where to Next

- Repeat and repeat! but with ‘Cabernet Sauvignon’ as the standard
- Examine the cellular physiology See poster #42
- Document the histology How is water content managed?
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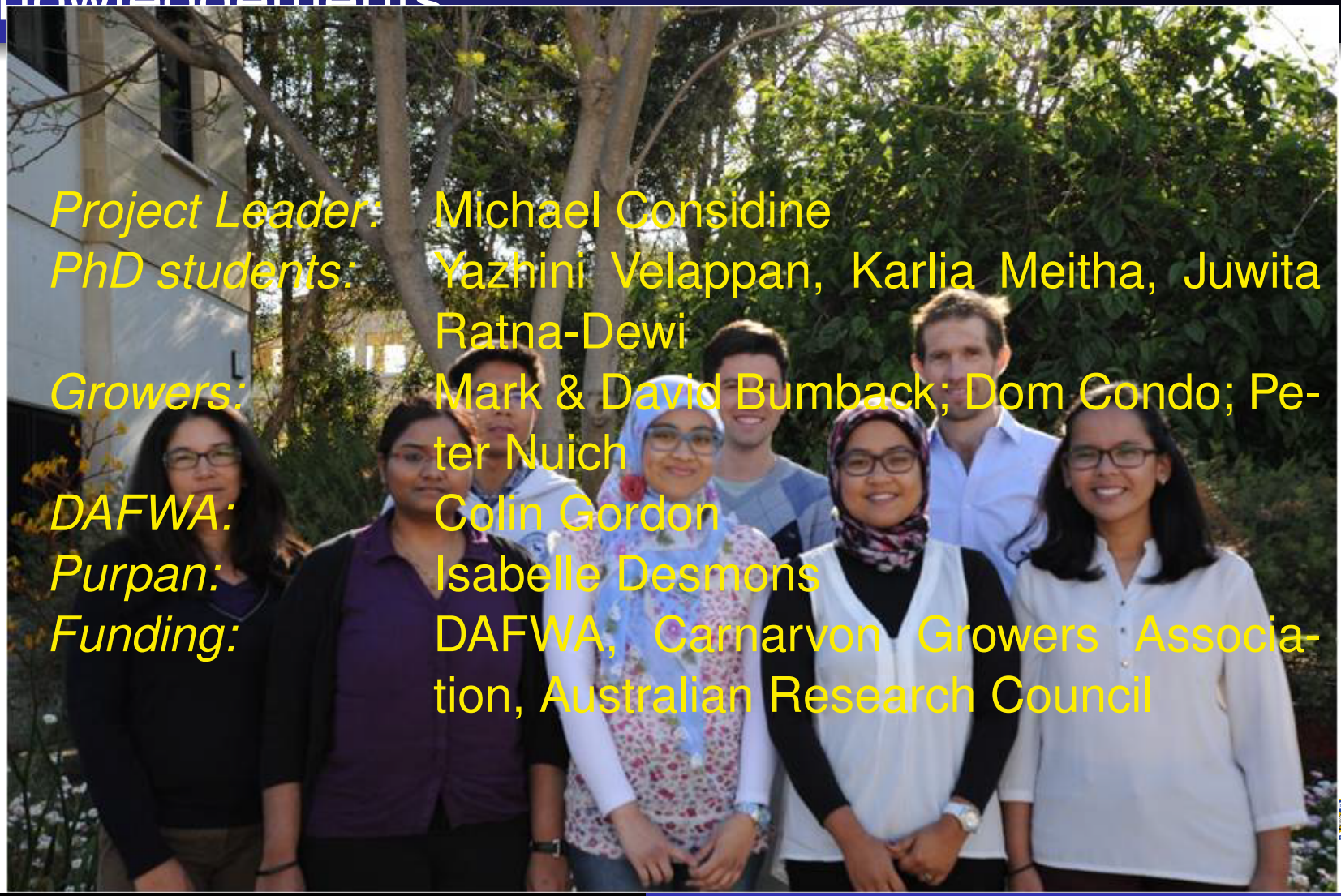

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