

Getting what you paid for:
Grapevine clonal identity testing
Presented by Anthony Borneman
July 2024



Quality assurance testing

- Variety

- Health

- Clone



Quality assurance

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- Health

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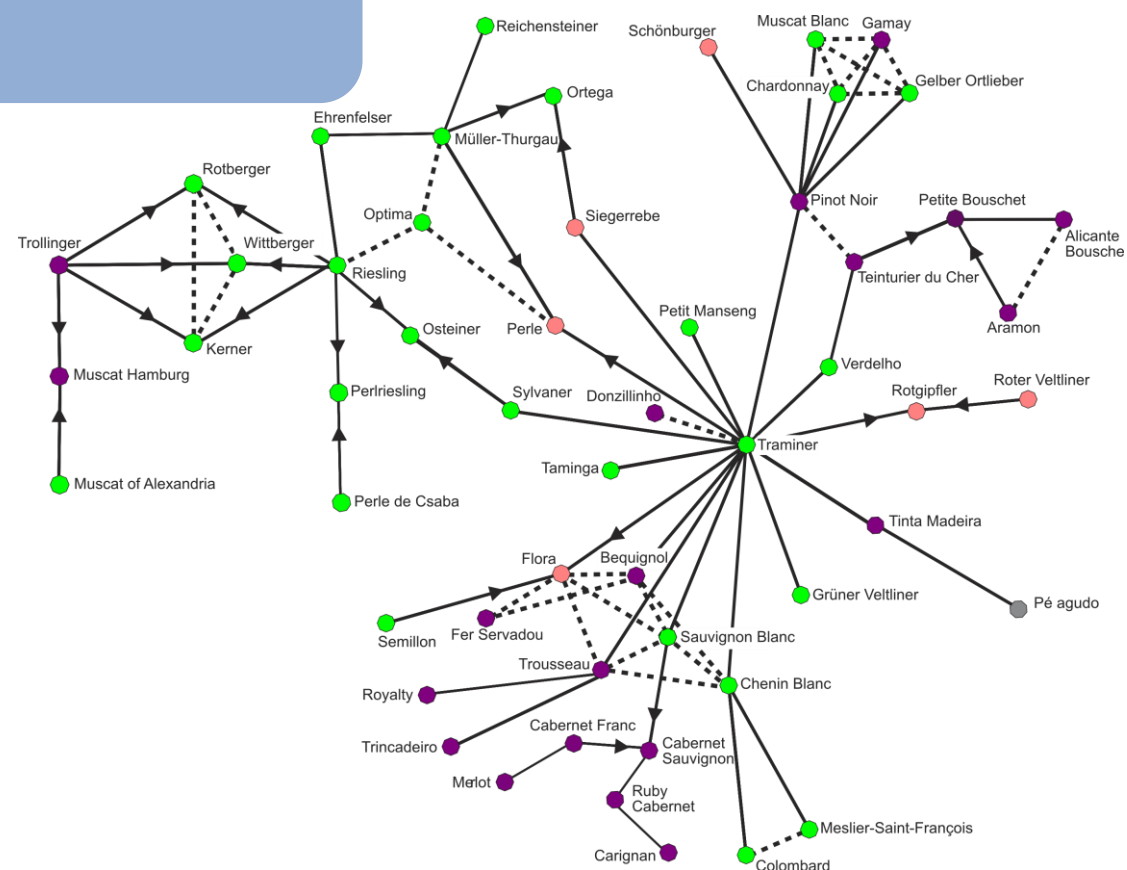
Grapevine varieties



- Large amount of genetic variation
- Vast majority due to sexual recombination
- Minor proportion due to mutation

Genetics of grapevine varieties

- CSIRO microsat marker (AGRF)
- CSIRO SNP panel (Affinity)



Quality assurance

- Variety

- Health

- Clone



Virus

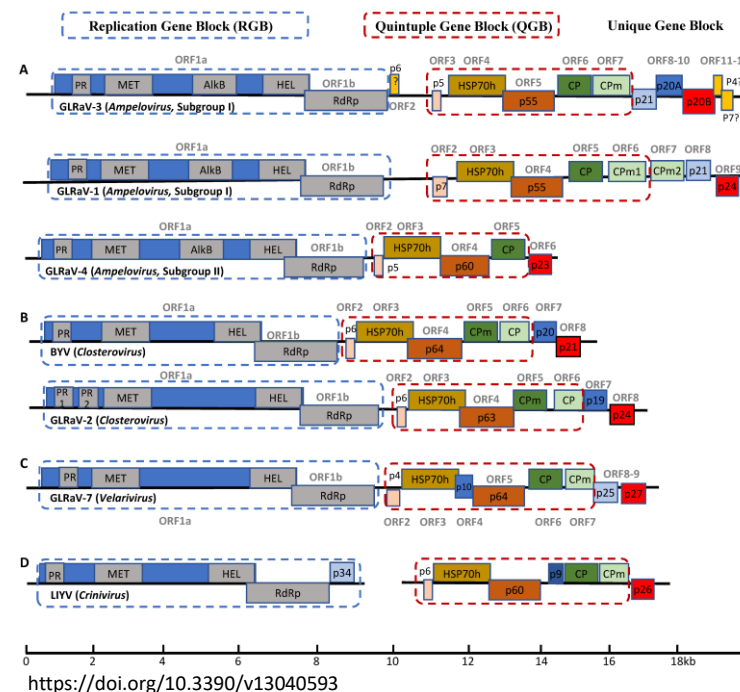
- >80 recognised virus and virus-like diseases of grapevines worldwide
- 12 endemic to Australia

Molecular testing

- PCR
- qPCR
- ELISA

Virus testing is offered by four commercial laboratories in Australia:

- Affinity Labs, SA
- Crop Health Services, VIC
- DPIRD's Diagnostic Laboratory Services, WA
- Biosecurity TAS – Plant Diagnostic Services



Molecular testing (PCR)



Quality assurance

- Variety

- Health

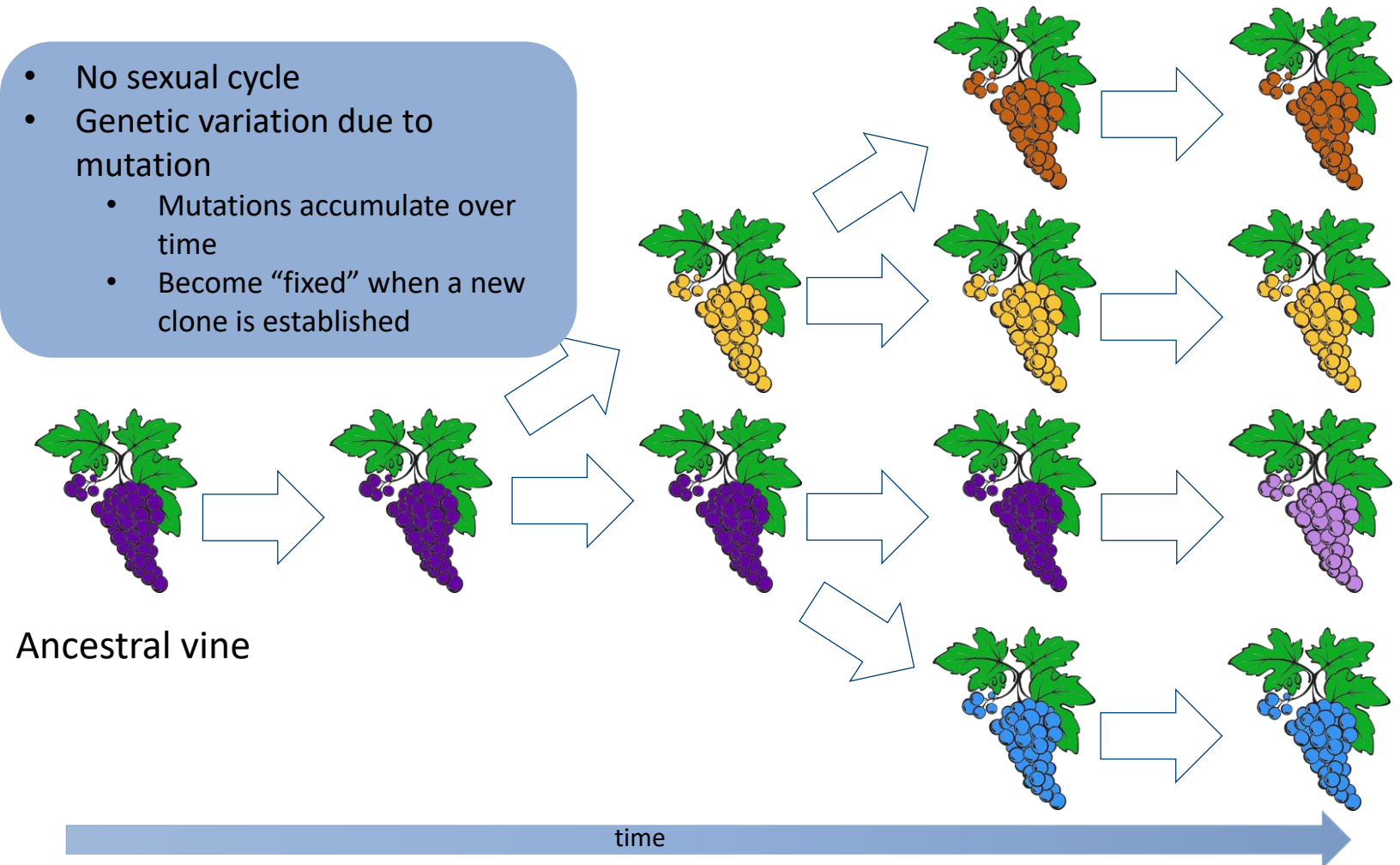
- Clone



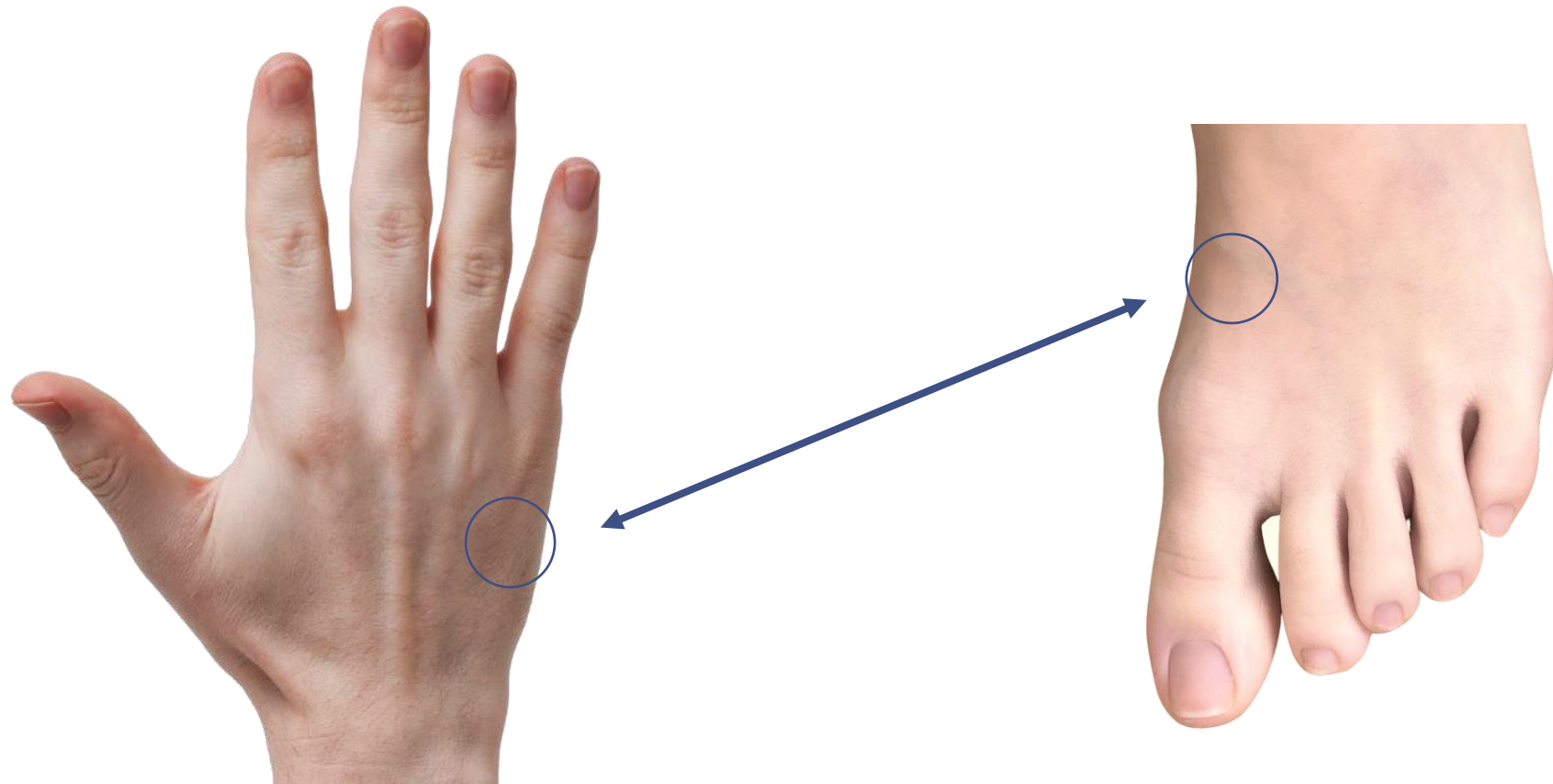
The problem of clones



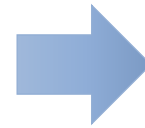
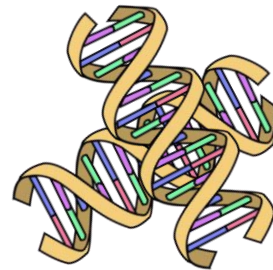
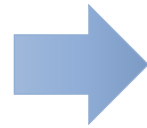
- No sexual cycle
- Genetic variation due to mutation
 - Mutations accumulate over time
 - Become “fixed” when a new clone is established



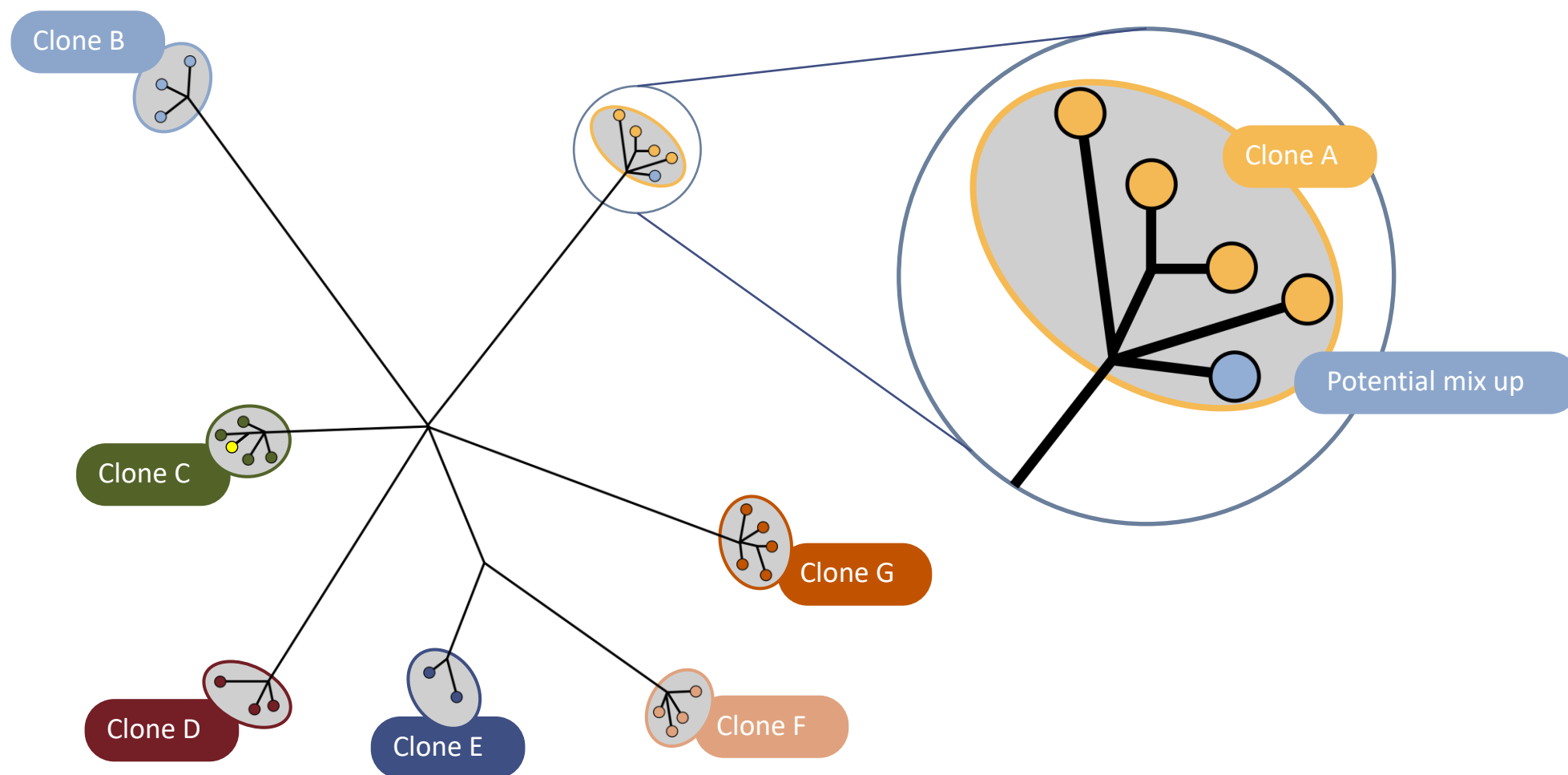
The problem of clones



Clonal genetics framework



“Identity by consensus”



A clonal ID case study - Gingin

24 canes of 'Pinot Chardonnay' imported into Western Australia in 1957 from UC Davis

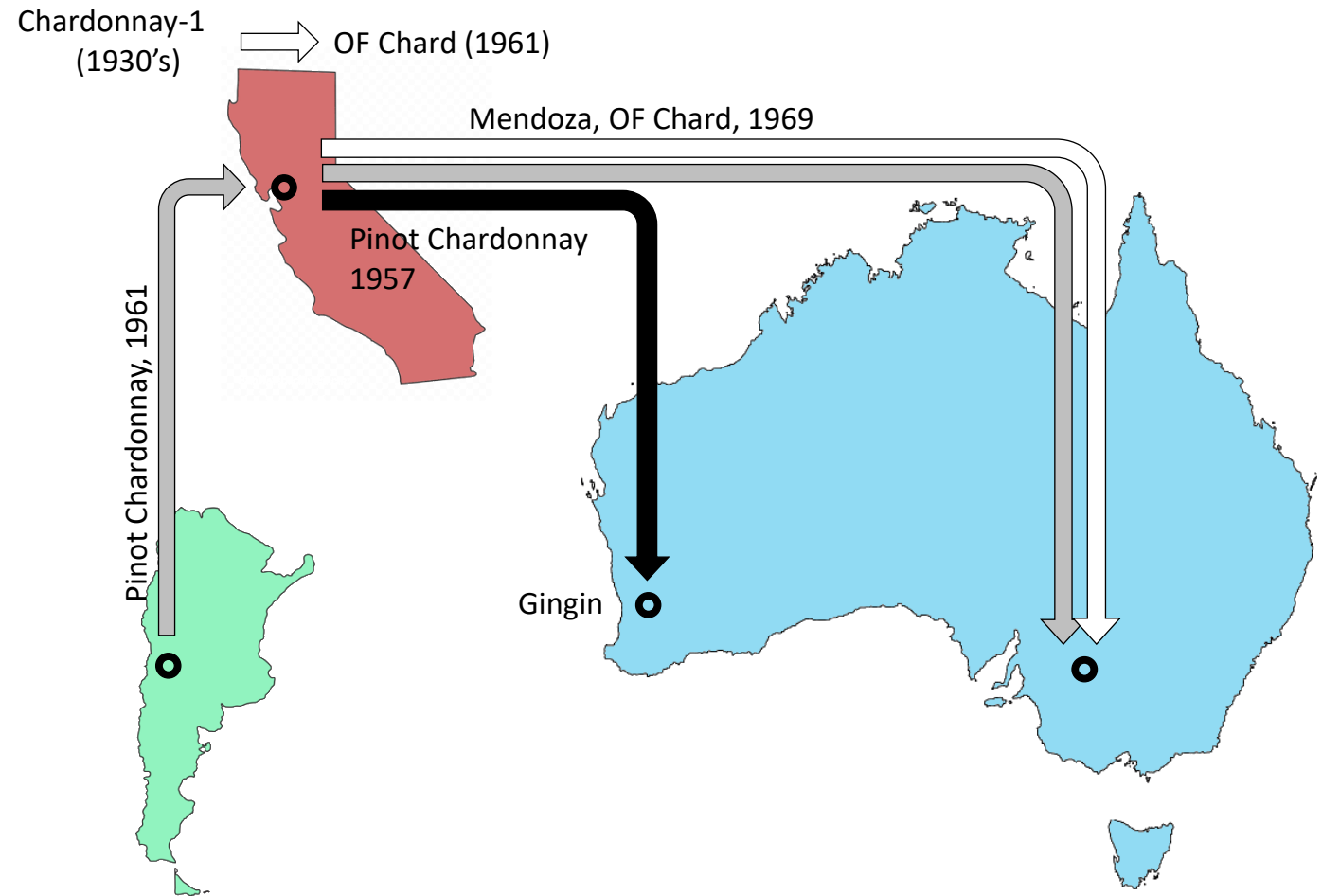
Planted at the Swan Research Station near Gingin

Major clone in Western Australia

Precise origins were not known

Considered synonymous with

- Old Foundation Chardonnay (OF Chard)
- Mendoza
- Both imported from UC Davis



A clonal ID case study - Gingin

Gingin samples

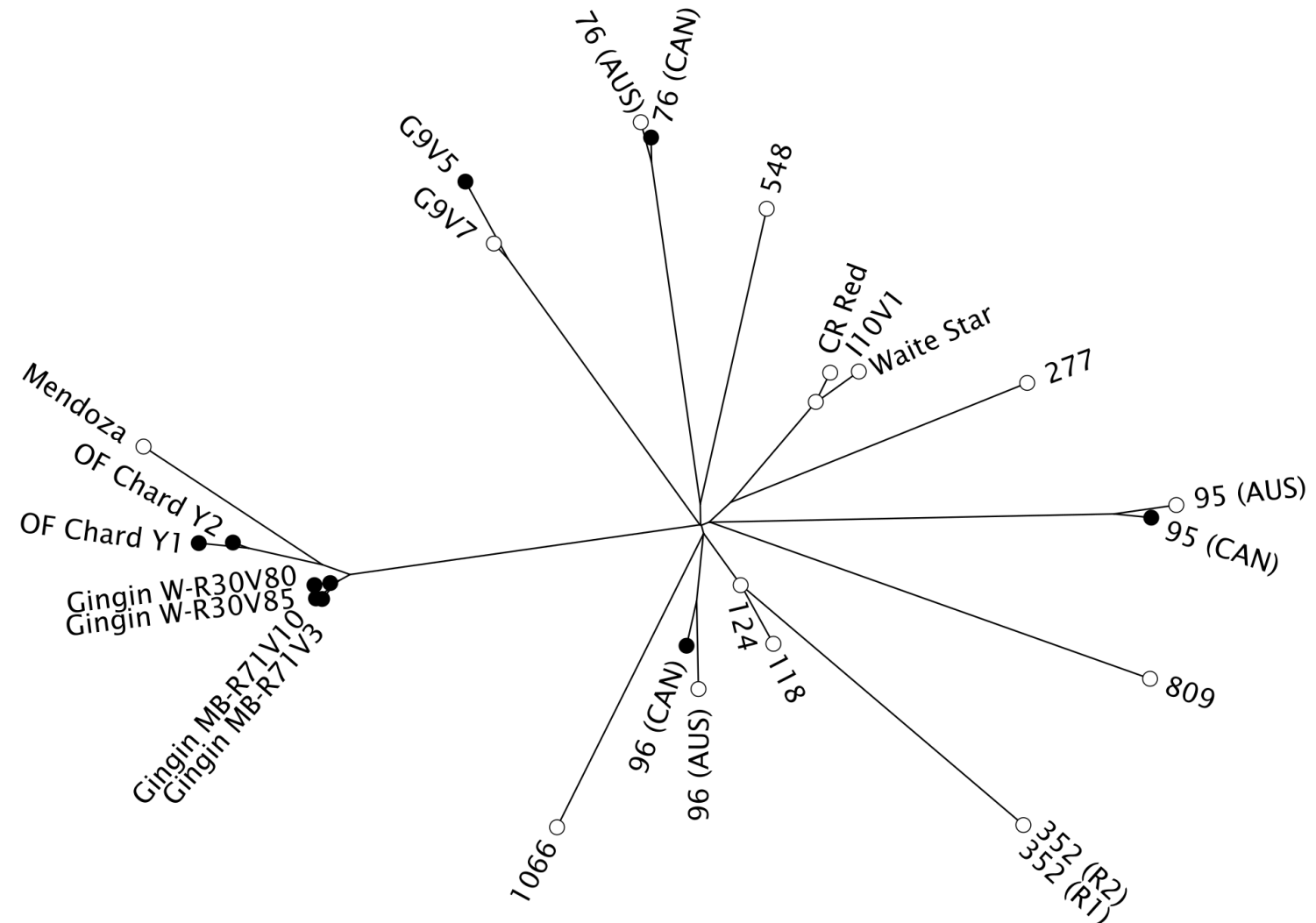
- Moondah Brook Vineyard, WA
 - MB- R71V3
 - MB-R71V10
- Harvey Ag Col, Wokalup, WA
 - W-R30V80
 - W-R30V85

OF Chard

- Yalumba Nursery
 - OF Chard Y1
 - OF Chard Y2

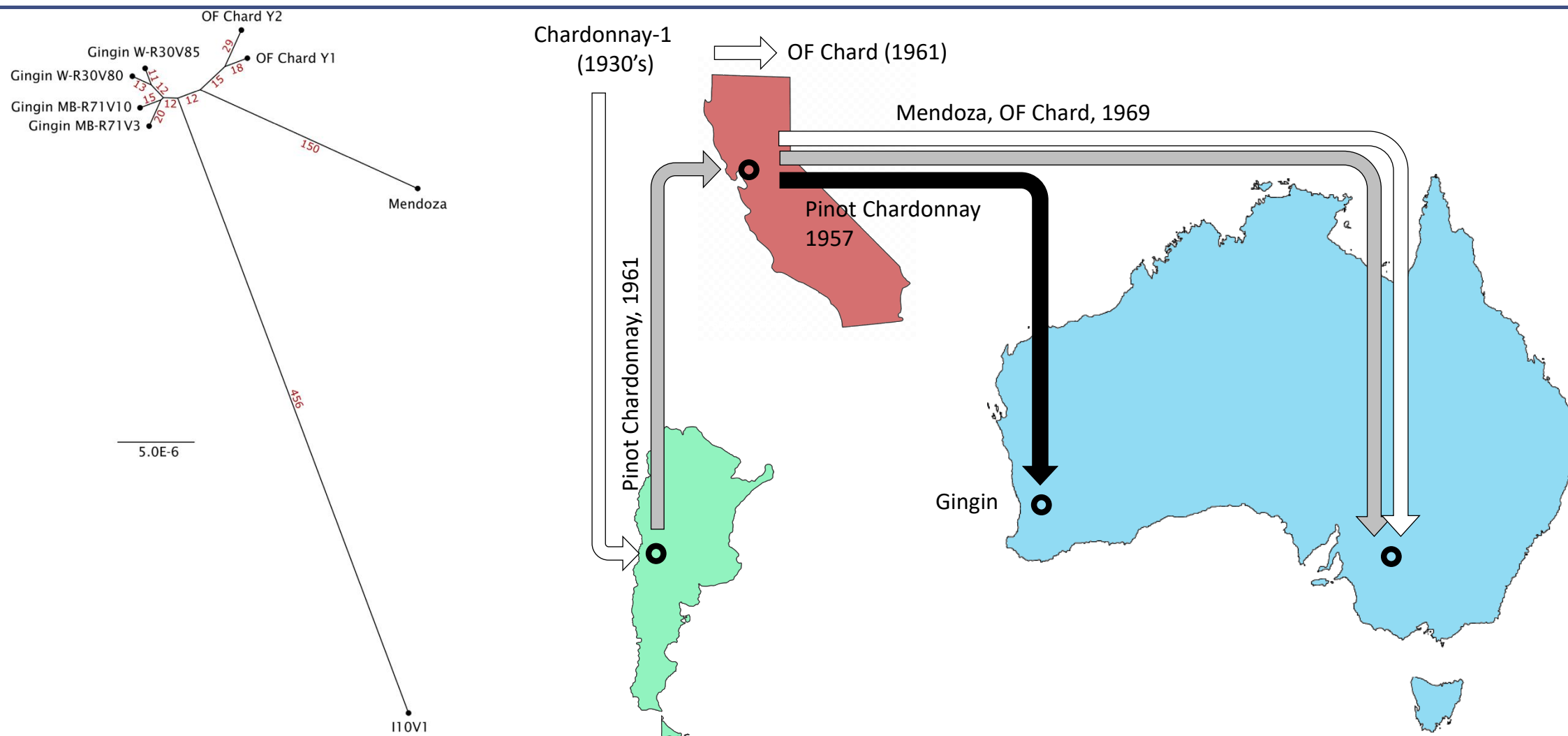
Mendoza

- Nuriootpa Research Centre



4.0E-6

A clonal ID case study - Gingin

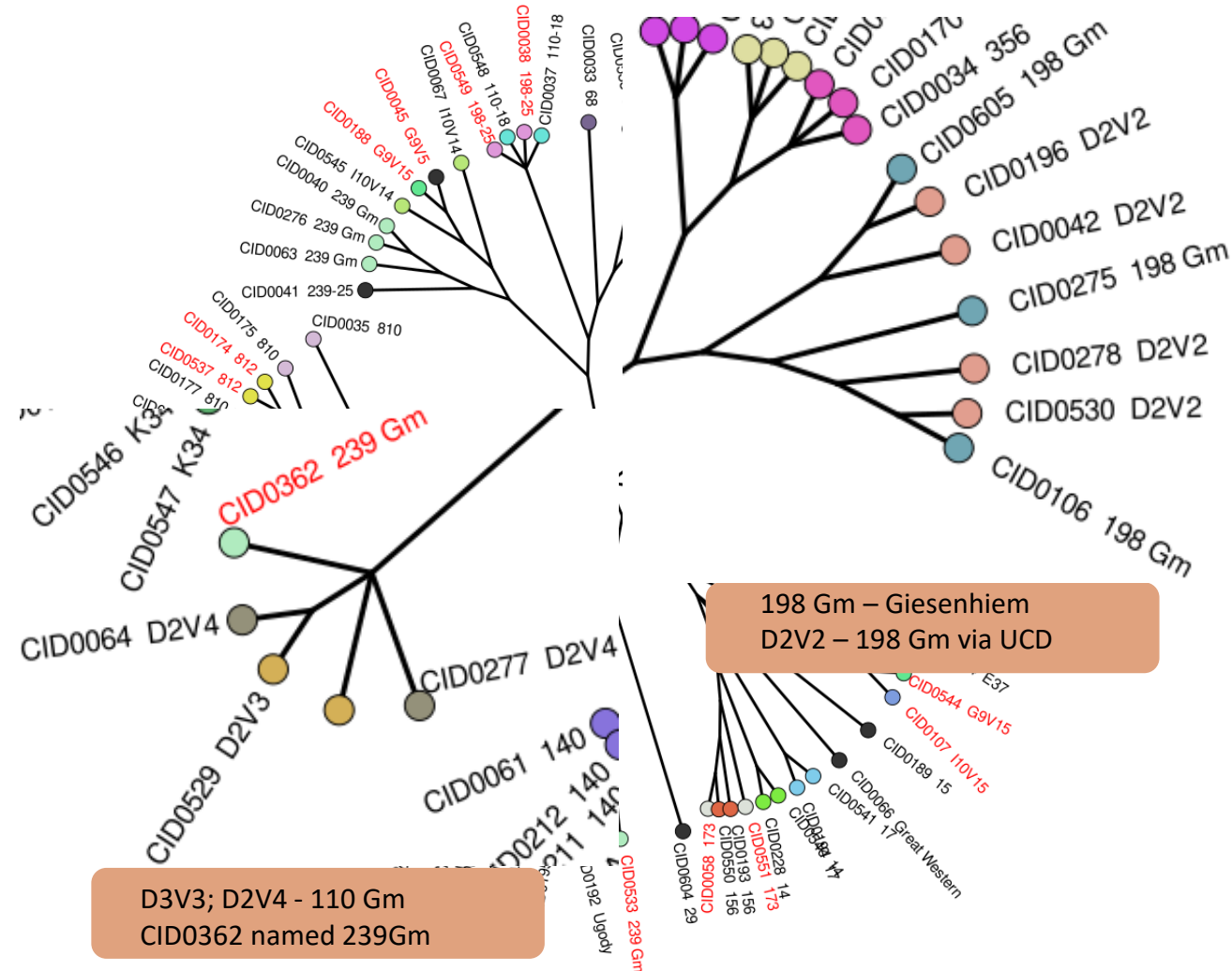


Defining Australia's wine grape germplasm

- Sequencing >1100 samples
 - 35 varieties
 - 571 unique clones (clonal names)

Partners

- CSIRO
- SARDI
- MIAVIS
- SAVIA
- WAVIA
- ARM Nurseries
- Howard Park Wines
- Yalumba Nurseries
- Accolade
- Brown Family Wine Group
- Treasury Wine Estates

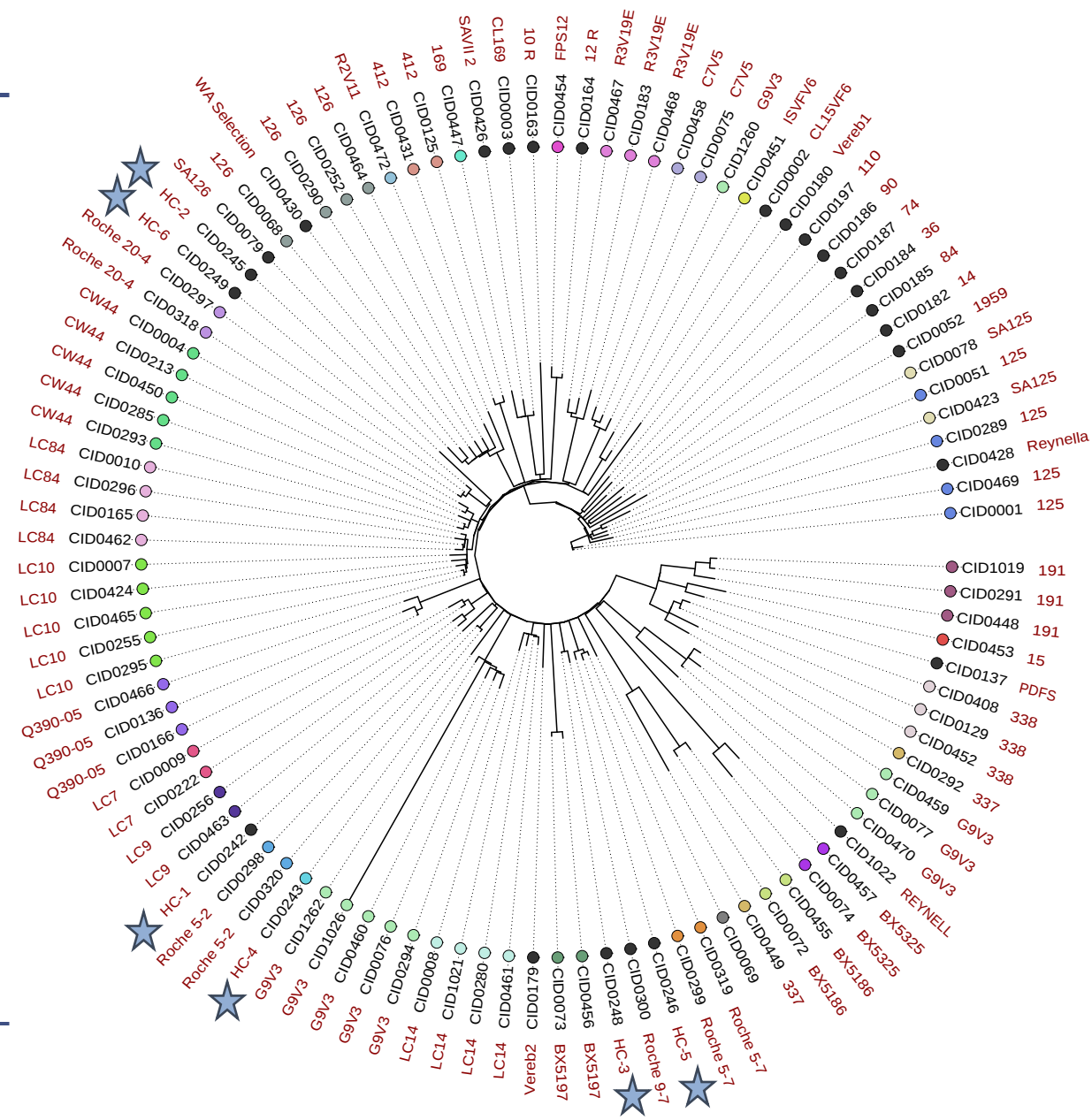


Cabernet Sauvignon

- 127 samples
- 63 clones

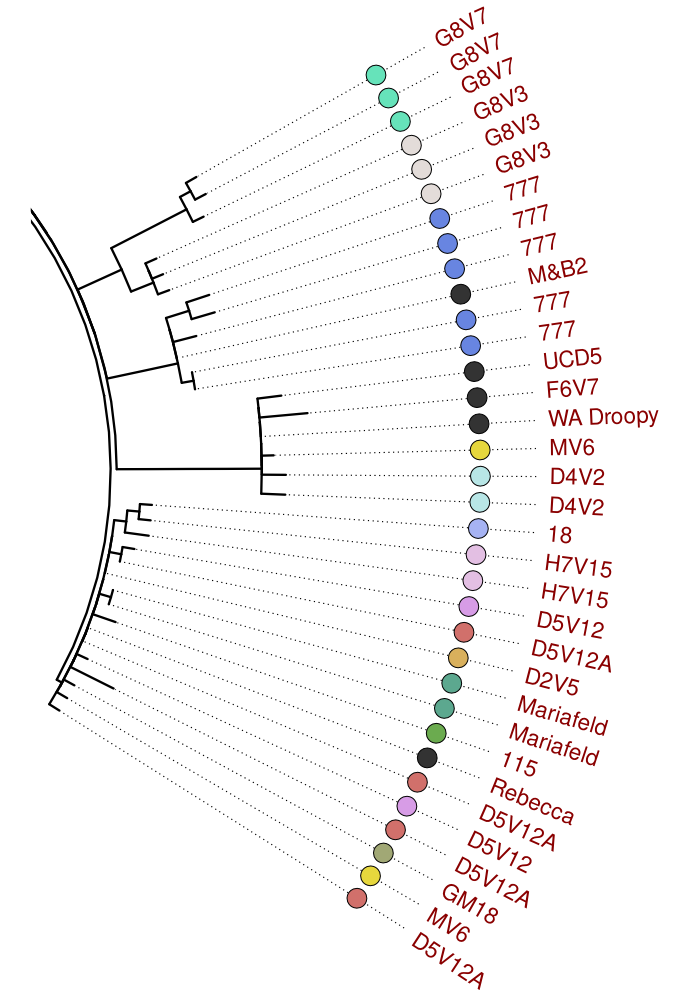
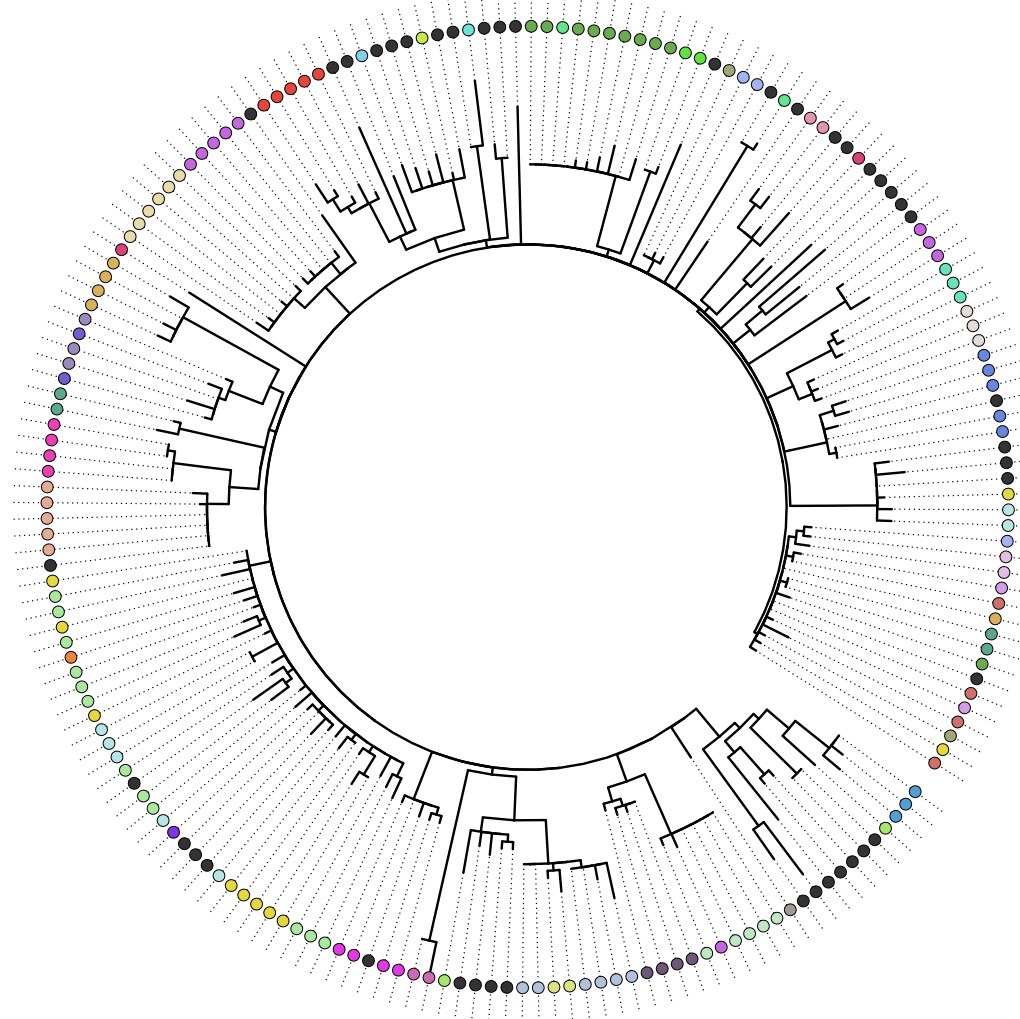
Houghton Material

- HC 1 - 6 included
- Unique genetics with respect to other clones



Pinot

- Pinot Noir, Gris, Blanc and Meunier
 - 171 samples
 - 75 clones



The future

Access to a foundational genetic dataset encompassing grapevine clonal germplasm in Australia

- **Sequence verified germplasm**
 - Mother vines
 - Pre/Post Importation
- **Insights into Heritage material (2024/25)**
 - Ancestor vines (125 yr+)
 - Relationship to modern clones
 - Patterns of historical distribution
- **Clonal testing services**
 - Existing vineyards
 - Ongoing supplier QA
 - Commercial testing beta rollout currently in EOI stage



Acknowledgements

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**Wine
Australia**

AWRI

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All the collaborators supplying grapevine clonal material

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