Background

- About 95% of vineyard area is planted with own-rooted vines
- More than 80% of vineyard area is planted with own-rooted *Vitis vinifera* cultivars
- In the absence of phylloxera, own-rooted vines have several advantages over grafted vines:
  - less expensive
  - no need to cover trunk base over winter
Background

- However, in the presence of phylloxera, own-rooted vines of *Vitis vinifera* will sustain serious root damage and get killed by phylloxera.

- Phylloxera is present in most of the world’s grape growing regions. The only viable option to grow *Vitis vinifera* cultivars in the presence of phylloxera is to use phylloxera-tolerant rootstocks.
Colorado rootstock trials

Background

• The first replicated rootstock trial was planted at the Western Colorado Research Center – Orchard Mesa in 1993 (Chardonnay on 4 rootstocks)

• Rootstocks were 101-14, 3309, 420A, and 5C

• Long-term the best performance was by 5C

• 3309 and 101-14 performed poorly
Colorado rootstock trials

Background

• A second replicated rootstock trial using Viognier grafted to 5 different rootstocks was planted at the Western Colorado Research Center – Orchard Mesa in 2009

• Own-rooted Viognier vines were included in the replicated trial
Colorado rootstock trials

- Based on the good performance of 5C in the 1993 Chardonnay trial, two *V. riparia* x *V. berlandieri* crosses were included (5C and 5BB)

- The other three rootstocks were *V. rupestris* x *V. berlandieri* crosses that had not been tested in Colorado

- Due to the poor performance of 101-14 and 3309 in the 1993 Chardonnay trial, *V. riparia* x *V. rupestris* crosses were not included
2009 Viognier rootstock trial

- Viognier own-rooted or grafted to five rootstocks
  - 5BB Kober \((V. \text{ riparia} \times V. \text{ berlandieri})\)
  - 5C Teleki \((V. \text{ riparia} \times V. \text{ berlandieri})\)
  - 110 Richter \((V. \text{ rupestris} \times V. \text{ berlandieri})\)
  - 140 Ruggeri \((V. \text{ rupestris} \times V. \text{ berlandieri})\)
  - 1103 Paulsen \((V. \text{ rupestris} \times V. \text{ berlandieri})\)

- Planted in 2009: 5BB, 140Ru, own

- Planted in 2010: 5C, 110R, 1103P

- Some replants in 2011 & 2012
2009 Viognier rootstock trial

- Randomized complete block design with 7 replications
- Four vines per replication
- Row x vine spacing is 8’ x 5’
- Drip irrigation
2009 Viognier rootstock trial

- Cordon and spur pruning (B2C2)
- Vertical shoot positioning
- Soil type is Turley clay loam (0 - 2 % slope)
- No or minimal yield in 2013 and 2014 due to cold temperature damage
- First harvest data in 2015
2009 Viognier rootstock trial

VERY high yield per cropping vine in 2018 with rootstock 140Ru, BUT....
2009 Viognier rootstock trial

...VERY low vine survival with rootstock 140Ru.
2009 Viognier rootstock trial

• The low vine survival has resulted in the lowest per acre yield with rootstock 140Ru
2009 Viognier rootstock trial
2009 Viognier rootstock trial

- The highest 4-year cumulative yield was with vines grafted to 5C and own-rooted vines
- The lowest 4-year cumulative yield was with vines grafted to 140Ru
2009 Viognier rootstock trial

Viognier 2015 - 2018

Cumulative yield (ton/acre)

- 140Ru
- 1103P
- 110R
- 5BB
- 5C
- Own
2009 Viognier rootstock trial

- In 2017 the Yield : Pruning weight ratios ranged from 4.9 to 10.8 indicating vine balance (a Yield : Pruning weight ratio of 5-10 is considered appropriate for non-divided canopies)

- However, much higher ratios (10.9 to 18.9) in 2018 indicate that vines were overcropped
Note that we long-prune (aka double prune) all our vines. Leaving spurs 8 to 10 nodes long reduces the pruning weight per vine by approximately 100-200 g.
Note that we long-prune (aka double prune) all our vines. Leaving spurs 8 to 10 nodes long reduces the pruning weight per vine by approximately 100-200 g, leading to a higher Yield : Pruning weight ratio. Striped box indicates desired range for non-divided canopies (5-10).
2009 Viognier rootstock trial

Summary

After four harvests

- Highest-yielding rootstock was 5C averaging 3.37 ton/acre, followed by 5BB (2.58 ton/acre), 110R (2.56 ton/acre), 1103P (2.21 ton/acre) and 140Ru (1.06 ton/acre)

- Own-rooted vines averaged 3.13 ton/acre
2009 Viognier rootstock trial

Summary

- Vine survival has been very low with 140Ru (17 %)

- Vine survival is best with own-rooted vines (96 %), followed by 5C (86 %), 5BB (64 %), 110R (57 %), 1103P (50 %), 140Ru (18 %)
Summary

• “Interesting” is the poor establishment and initial low vigor of 110R, 1103P, and 140Ru, all of which are considered to impart high to very high vigor to the scion.

• However, vine vigor of 1103P and 140Ru has dramatically increased the past two years (vines are now 7-10 years old).
2009 Viognier rootstock trial

Summary

These are preliminary results

• Encouraging is once again the good performance of 5C
2009 Viognier rootstock trial

For more detailed information on this and other research projects please review our Annual Research Reports available on our web page:
Questions?

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