



Grand Valley 2009 Viognier rootstock trial

Horst Caspari



2009 Viognier rootstock trial – 2020 update

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
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2009 Viognier rootstock trial – 2020 update

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 now present in several of Colorado grape growing areas. The only viable option to grow *Vitis vinifera* cultivars in the presence of phylloxera is to use phylloxera-tolerant rootstocks
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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
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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
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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
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2009 Viognier rootstock trial design

- Viognier own-rooted or grafted to five rootstocks
 - 5BB Kober (*V. riparia* x *V. berlandieri*)
 - 5C Teleki (*V. riparia* x *V. berlandieri*)
 - 110 Richter (*V. rupestris* x *V. berlandieri*)
 - 140 Ruggeri (*V. rupestris* x *V. berlandieri*)
 - 1103 Paulsen (*V. rupestris* x *V. berlandieri*)
- Planted in 2009: 5BB, 140Ru, own
- Planted in 2010: 5C, 110R, 1103P
- Some replants in 2011 & 2012



2009 Viognier rootstock trial design

- Randomized complete block design with 7 replications
 - Four vines per replication
 - Row x vine spacing is 8' x 5'
 - Drip irrigation
 - Micro-sprinkler with grass cover crop since fall 2018
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2009 Viognier rootstock trial design

- Cordon and spur pruning [plus 2 canes in years with significant bud damage(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
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- An extreme cold event occurred in late October 2019.
 - We used this “opportunity” to evaluate the potential effect of rootstock on bud cold injury
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Extreme cold event in late October 2019

Temperatures recorded at WCRC

- 30 October: 7.8 F Previous record 20 F (1993)
- 31 October: 8.6 F Previous record 15 F (1991)

Temperatures reported by the National Weather Service for Grand Junction, CO for October 30 and 31 were 7 F and 6 F, respectively. Previous records for those two days were 19 F (1972) and 16 F (1917).



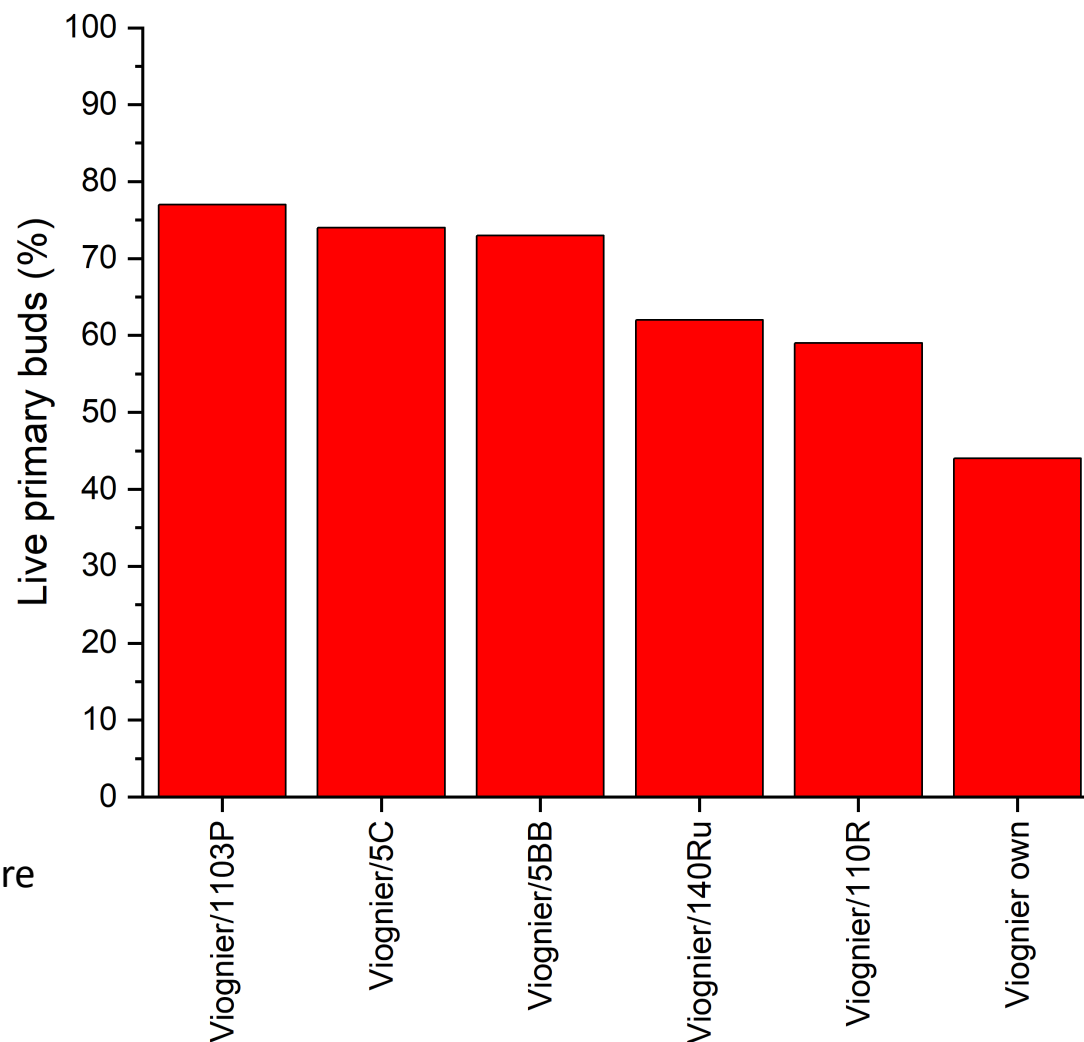
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Assessing bud cold injury

- In early November, 20 canes were collected from each rootstock
 - Evaluated 5 basal buds per cane (100 buds per rootstock)
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Assessing bud cold injury



Minimum temperature
recorded 30 and 31
October 2019: 8.6 F

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Assessing bud cold injury

- Highest primary bud damage (56 %) on own rooted Viognier
 - Lowest Viognier primary bud damage when grafted to 1103P (23 %), 5C (26 %) and 5BB (27 %)
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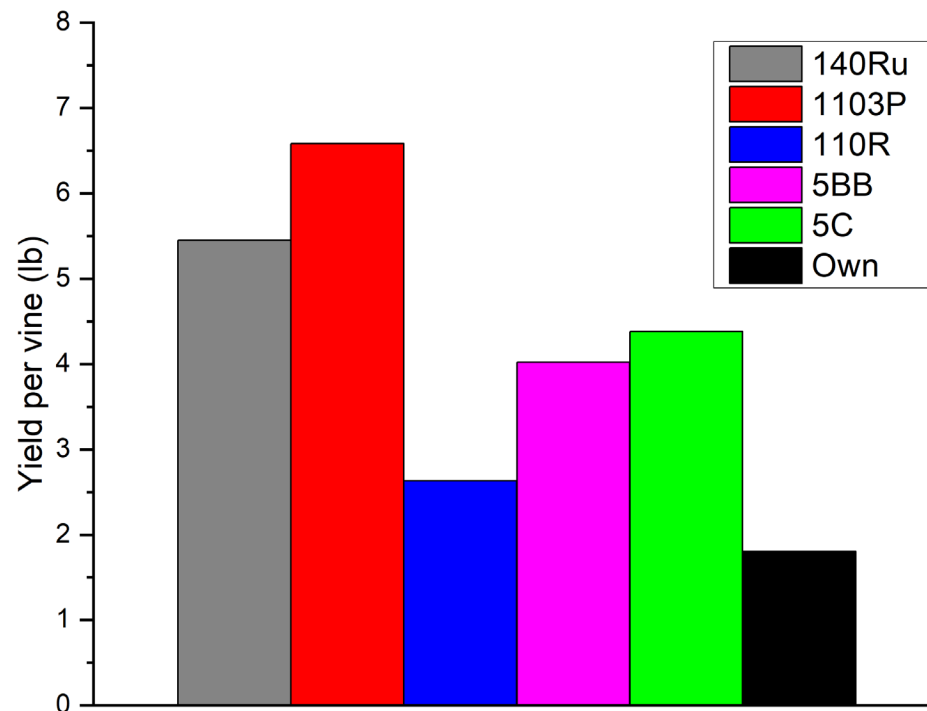


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- Another extreme cold event occurred in mid April 2020
 - Minimum temperature on 14 April was 18 F (previous record 22.9 in 2014)
 - It is not known if this late spring frost close to bud break caused further bud damage or not
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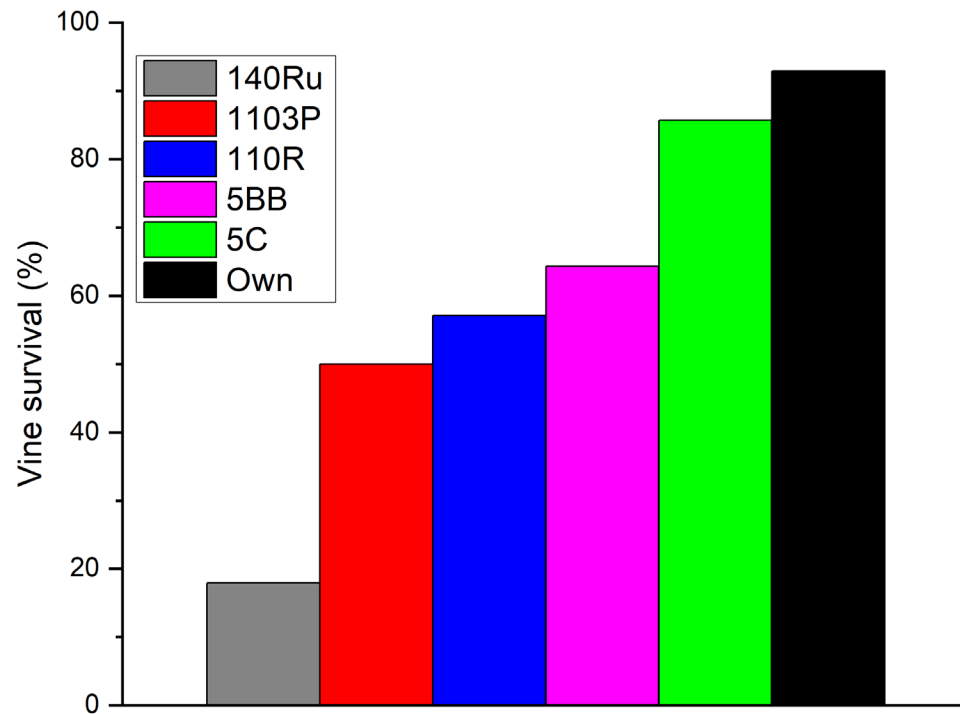
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Highest yield per cropping vine in 2020 with rootstock 1103P and 140Ru, BUT....



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...VERY low vine survival with rootstock 140Ru.



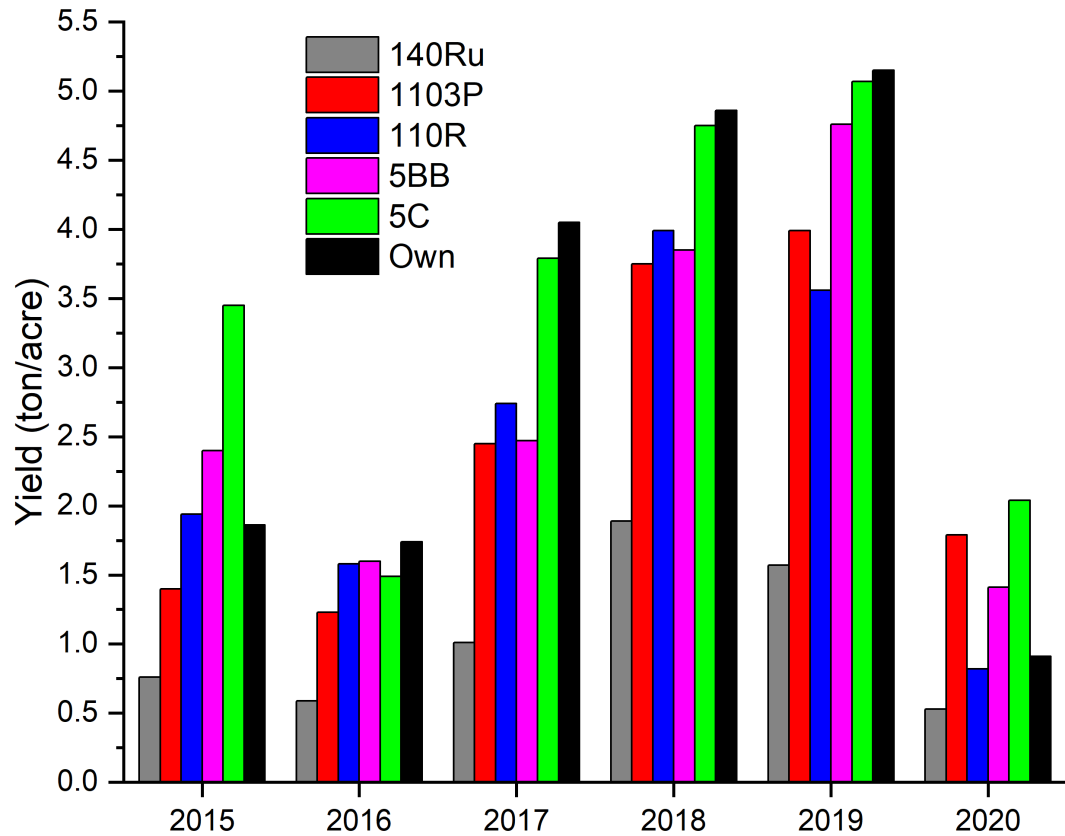
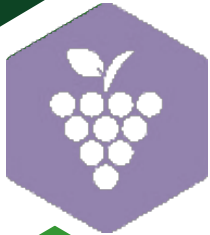


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- The low vine survival has resulted in the lowest per acre yield with rootstock 140Ru in every year since 2015
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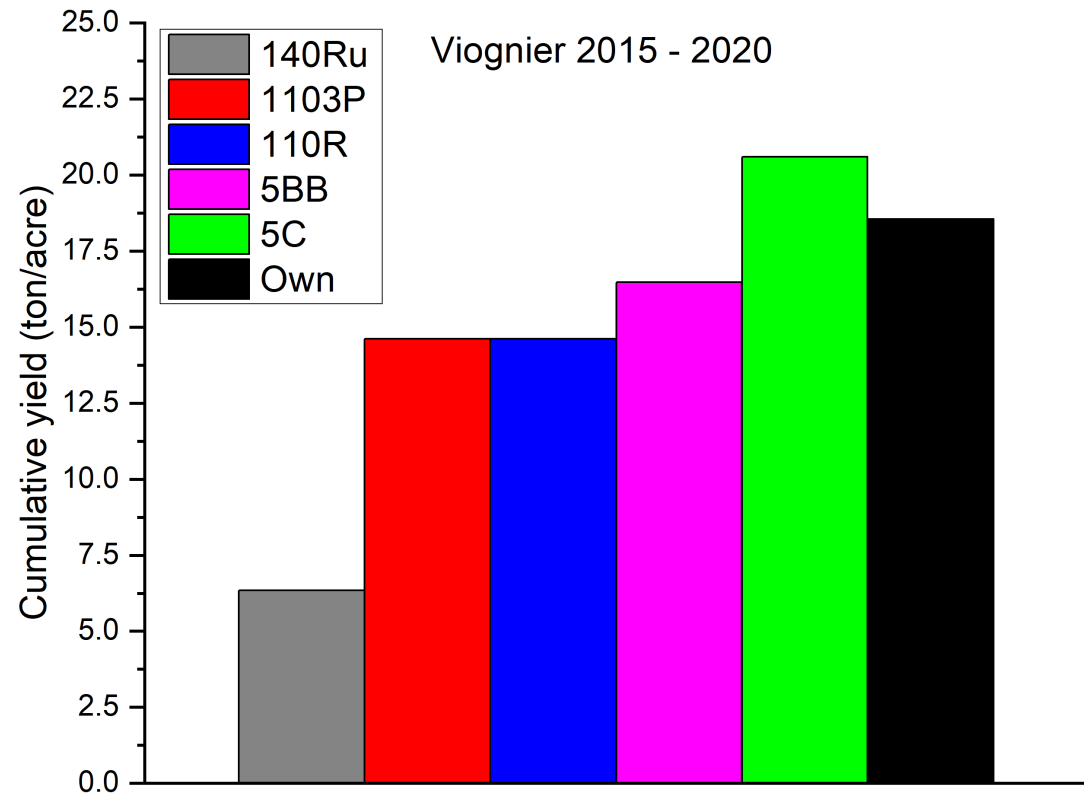
- Yield in 2020 was down on average 69 % compared to 2019
 - Lower yield was largely due to lower number of clusters (down 65 %)
 - Lower average cluster weight (down 15 %) also contributed
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2009 Viognier rootstock trial – 2020 update

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- The highest 6-year cumulative yield was with vines grafted to 5C and own-rooted vines
 - The lowest 6-year cumulative yield was with vines grafted to 140Ru
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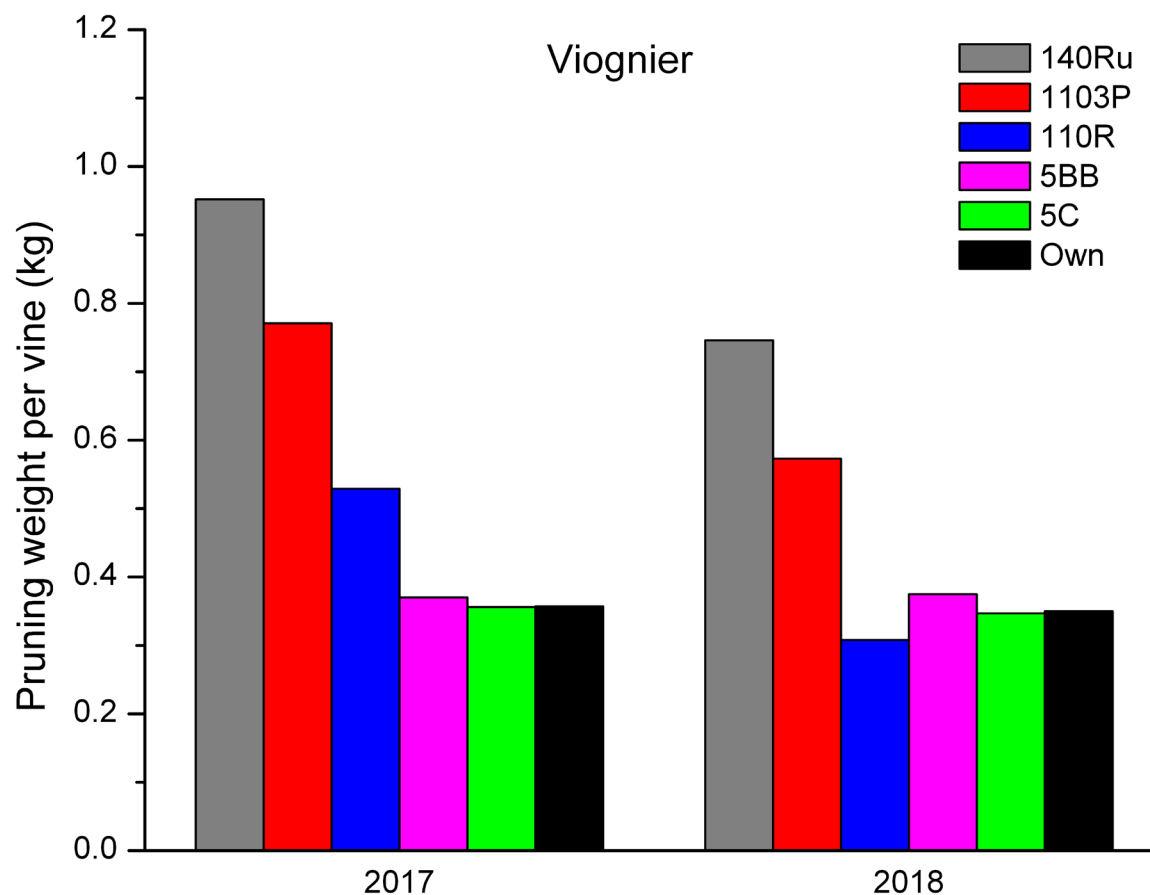
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2009 Viognier rootstock trial – 2020 update

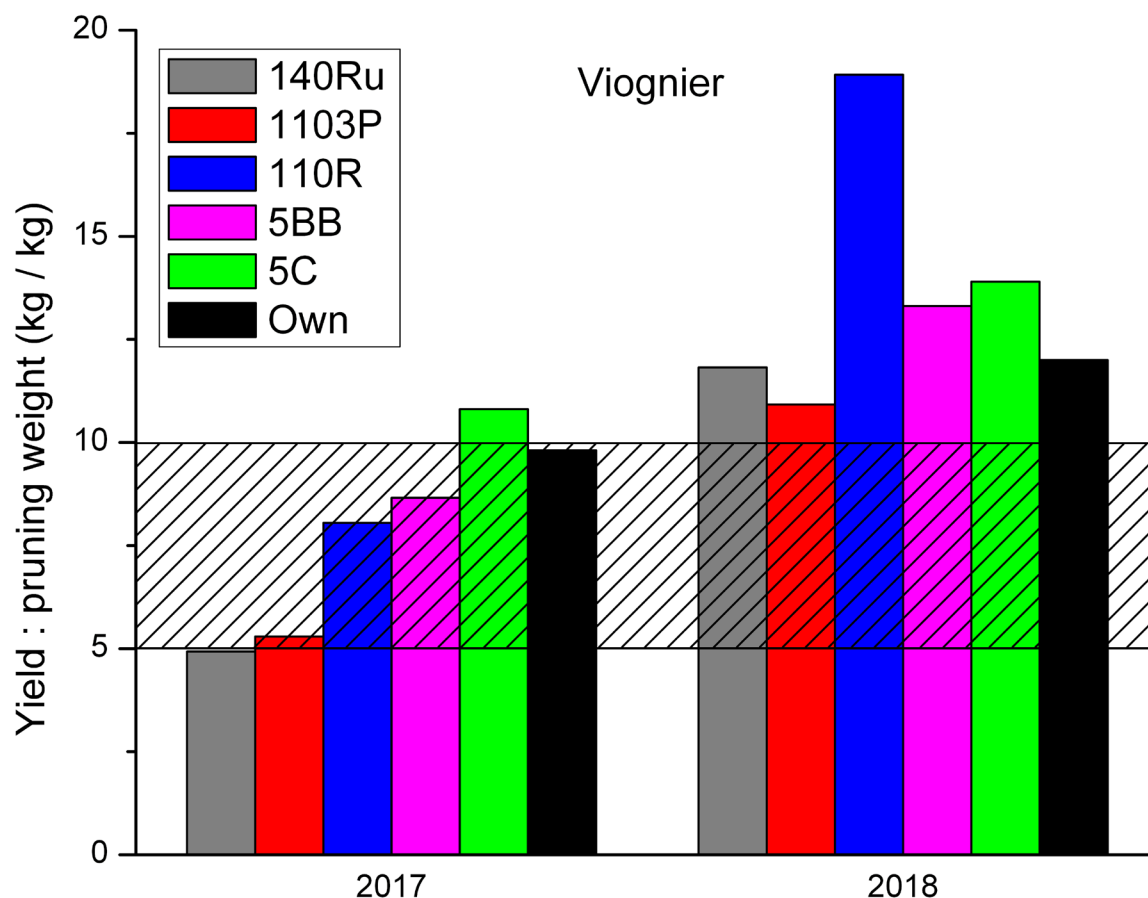
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- In 2017 the Ravaz Index (Yield : Pruning weight ratio) ranged from 4.9 to 10.8 indicating vine balance (a Ravaz Index of 4 to 10 is considered appropriate for non-divided canopies)
 - Much higher ratios in 2018 (10.9 to 18.9) and in especially in 2019 (13.1 to 31.7) indicate that vines were overcropped
 - However, 2019 values are inflated as we pruned very conservatively (leaving very long spurs and extra canes) due to bud damage
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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.

2009 Viognier rootstock trial – 2020 update



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).



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Summary

After six 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
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Summary

- Vine survival has been very low with 140Ru (17 %)
 - Vine survival is best with own-rooted vines (93 %), followed by 5C (86 %), 5BB (64 %), 110R (57 %), 1103P (50 %), 140Ru (18 %)
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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)
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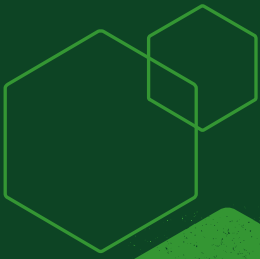
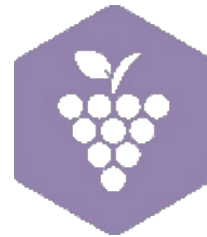
Summary

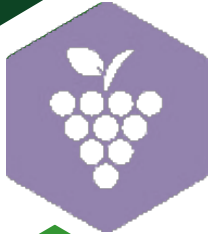
This study is continuing

- Encouraging is once again the good performance of 5C
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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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