



Optimising Chardonnay Viticulture

Mark Krasnow, Ph.D.
Thoughtful Viticulture Ltd.

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Sustainable science-based solutions

What contributes to a good Chardonnay wine?

Unlike some of the other white varieties there is not extensive research into what grape properties are directly linked to “quality” in Chardonnay.

While there are certainly anecdotal preferences for certain clones there is just not the same understanding around the chemistry. In reds there are phenolics, methoxypyrazine, etc. Sauv – you’ve got thiols and terpenes – those are pretty well understood.

Without this information one of the most important things we can do in the vineyard to help produce premium chardonnay is growing enough clean fruit for the wines you’re trying to make.



Challenges of Growing Chardonnay



Early Budburst

- Prolonged frost/cold damage risk period
- Fruit set variability across seasons
- Climate change?



Challenges of Growing Chardonnay



Disease Prone

- Susceptible to powdery mildew and botrytis
- Tight bunch structure (some clones)
- Difficult to impose water stress before veraison
- Pruning structure for increasing yields can increase this risk
- Can influence harvest date and hang time

Viticultural tools to deal with challenges



- Pruning type and timing
- Clonal selection
- Sprays
- Irrigation management
- Floor management
- Canopy management
- Trellis type



Pruning type and timing

- Late pruning delays budburst (but only a week or so)
- Double pruning or using a kicker cane can delay budburst, but add expense and are difficult with cane pruning.



Sprays

Timing

- Hit phenological timing of sprays critical
- Intervals are critical – keep growth between spray round in mind
- Make sure your vineyard prepared – trimmed, leaf plucked, etc.

Sprayer Calibration & Maintenance

- Output volume not good enough
- Coverage needs to be assessed repeatedly over the season
- Biologicals need to be applied before infection for best effect



Vigour management

While it is important to ensure vines have adequate nutrition/water to get the crop on in the early season, maintaining these practices too late into the season can compromise spray deposition, fruit zone microclimate, and physiological ripening cues, all of which degrade quality.

Considerations

- Avoid luxury water (SWP 0 to -5) after full canopy is developed
- Later season herbicide beneficial or detrimental?
- Save fertiliser for postharvest?



Canopy management

- Different methods/machines
- Multiple passes?
- Fruit overexposure?
- Timing is critical



Early defoliation as a tool to reduce rot and improve quality in Hawke's Bay grapes

- Two years of trial work (2010-11 and 2011-12) in many varieties, including Chardonnay



2010-2011 Trial-Hand defoliation timing

Hypothesis: Removal of a large amount of leaf area before flowering reduces set, giving more open bunches, improving health and quality

Treatments:

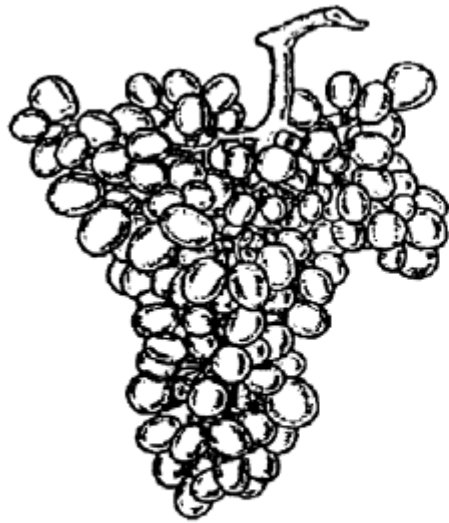
- Preflowering leaf removal (6 basal leaves)
- Preflowering JMS oil spray (no pluck)
- PBC leaf removal (6 basal leaves)



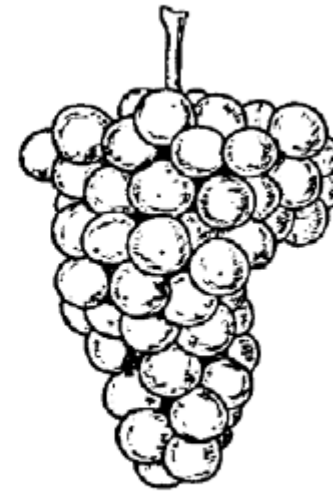




Bunch compactness was measured using the OIV 9-point scale



3



7



2010 - 2011 findings

So, the method was viable for improving fruit health, but hand defoliation was a non-starter




2011-2012 Hand vs. Mechanical Leaf Pluck Timing Trial



Tested hand removal of 6 basal leaves versus Gregoire sucker/cutter at:

- Pre-flowering
- Set
- PBC






CS

PRE

REP3

HAND

V3



CS PRE REP3 HAND V3



CS

PRE

REP1

MECH

V2

CS PRE REP1 MECH V2



Shoot tips removed by defoliator



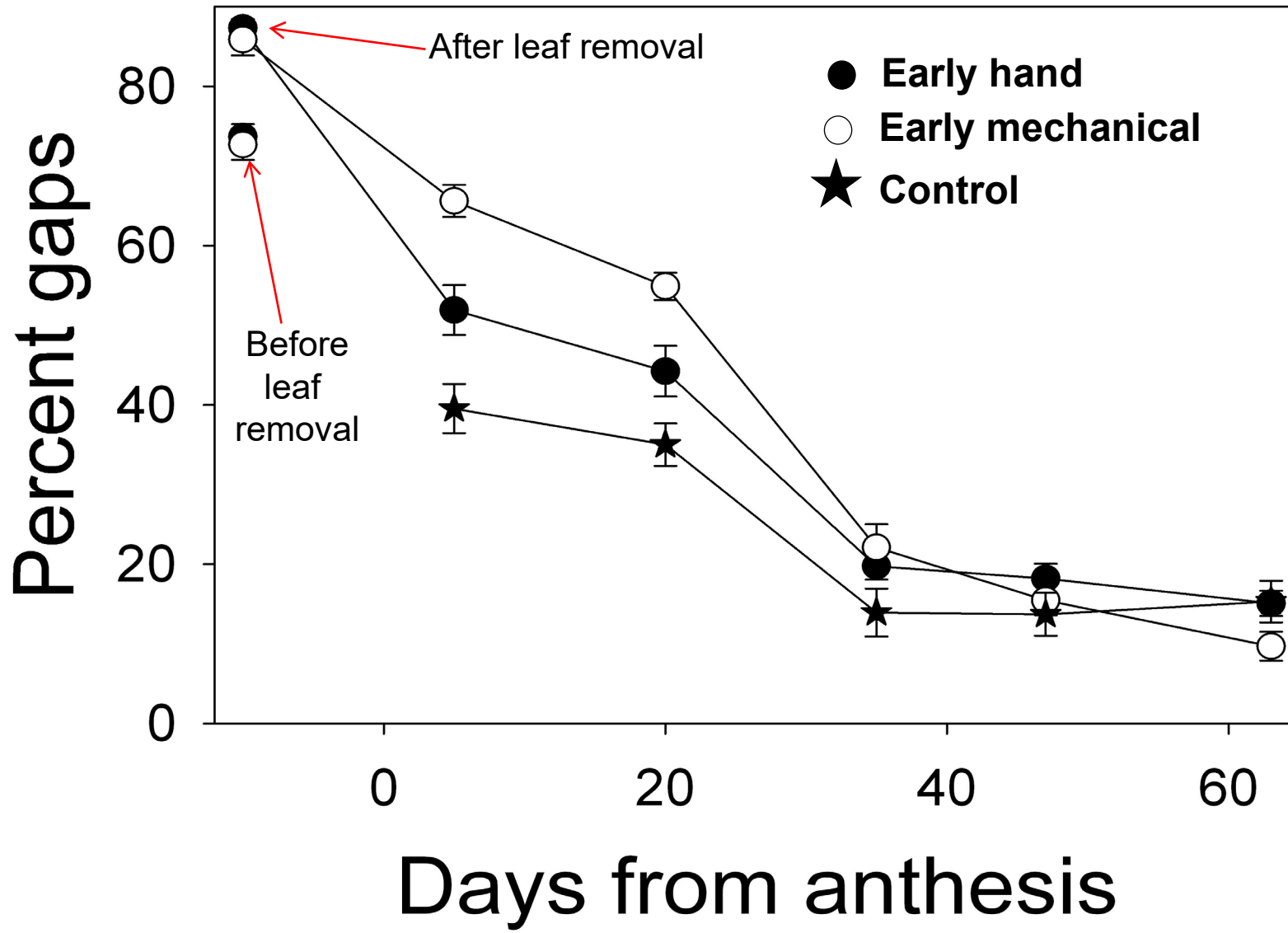
CS PRE REP1 MECH V2

Veraison leaf area measurement to quantify regrowth after defoliation

Treatment	Main leaf area/shoot	Lateral leaf area/shoot	Total leaf area/shoot
Early Hand	1844.93 a	1589.67 a	3434.60 ab
Early Mech	1667.87 a	3558.27 b	5226.13 bc
Set Hand	1926.47 a	1768.53 a	3695.00 ab
Set Mech	2472.93 a	2033.07 a	4506.00 abc
PBC Hand	2045.60 a	1720.93 a	3766.53 ab
PBC Mech	2064.27 a	1728.40 a	3792.67 ab
Control	4096.13 b	2172.27 a	6268.40 c

*Data from Cabernet Sauvignon, but similar in other varieties





Differential leaf regrowth rates from early leaf removal methods

*Data from Cabernet Sauvignon



Harvest yield (kg per vine--3 cane)

Treatment	Chardonnay
Early Hand	2.88 a
Early Mech	2.62 a
Set Hand	3.87 b
Set Mech	3.65 b
PBC Hand	3.74 b
PBC Mech	3.52 b
Control	4.05 b



Bunch compactness

Treatment	Chardonnay
Early Hand	4.72 a
Early Mech	4.93 ab
Set Hand	5.39 bc
Set Mech	5.39 bc
PBC Hand	5.75 c
PBC Mech	5.30 bc
Control	5.36 bc

*Bunch images from OIV



Rot severity (% of area infected)

Treatment	Chardonnay
Early Hand	12.3 ab
Early Mech	18.0 b
Set Hand	10.5 a
Set Mech	15.1 ab
PBC Hand	17.6 b
PBC Mech	24.1 c
Control	26.3 bc

*Bunch images Hill et al., 2010



Our Proposed Idea for a Chardonnay Yield Improvement Trial

Early defoliation (with Collard) of 4 cane Chardonnay

Hypotheses:

- Increase in overall yield because decrease in berries per bunch made up for by dramatically increasing bunch number
- Open canopy from defoliation improves spray deposition at critical flowering time and open bunch structure increases airflow/light within the bunch, improving fruit health, and allowing hangtime for larger crop to ripen



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Questions or comments?

Trial work?

thoughtfulviticulture@gmail.com

027 862 0234

www.thoughtfulviticulture.com

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