



# COMPARISON OF CHARDONNAY CLONES IN THE HAWKES BAY AND MARTINBOROUGH REGIONS.

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# HAWKES BAY CHARDONNAY

- Chardonnay is a versatile grape and is used to produce a range of wine styles.
- As a more neutral grape, it is able to showcase the terroir and is therefore regionally influenced.
- Growers also have a range of clones to select from, however their influence on wine characteristics is not as well researched and understood.
- A student trial was proposed to characterise different Chardonnay clones grown in the same vineyard.
- This was extended to include microvins and wine analyses.



Retrieved from: <https://www.nzwine.com/en/winestyles/chardonnay/>

# COMPARING CHARDONNAY CLONES



How do Chardonnay clones differ in terms of yield and composition?



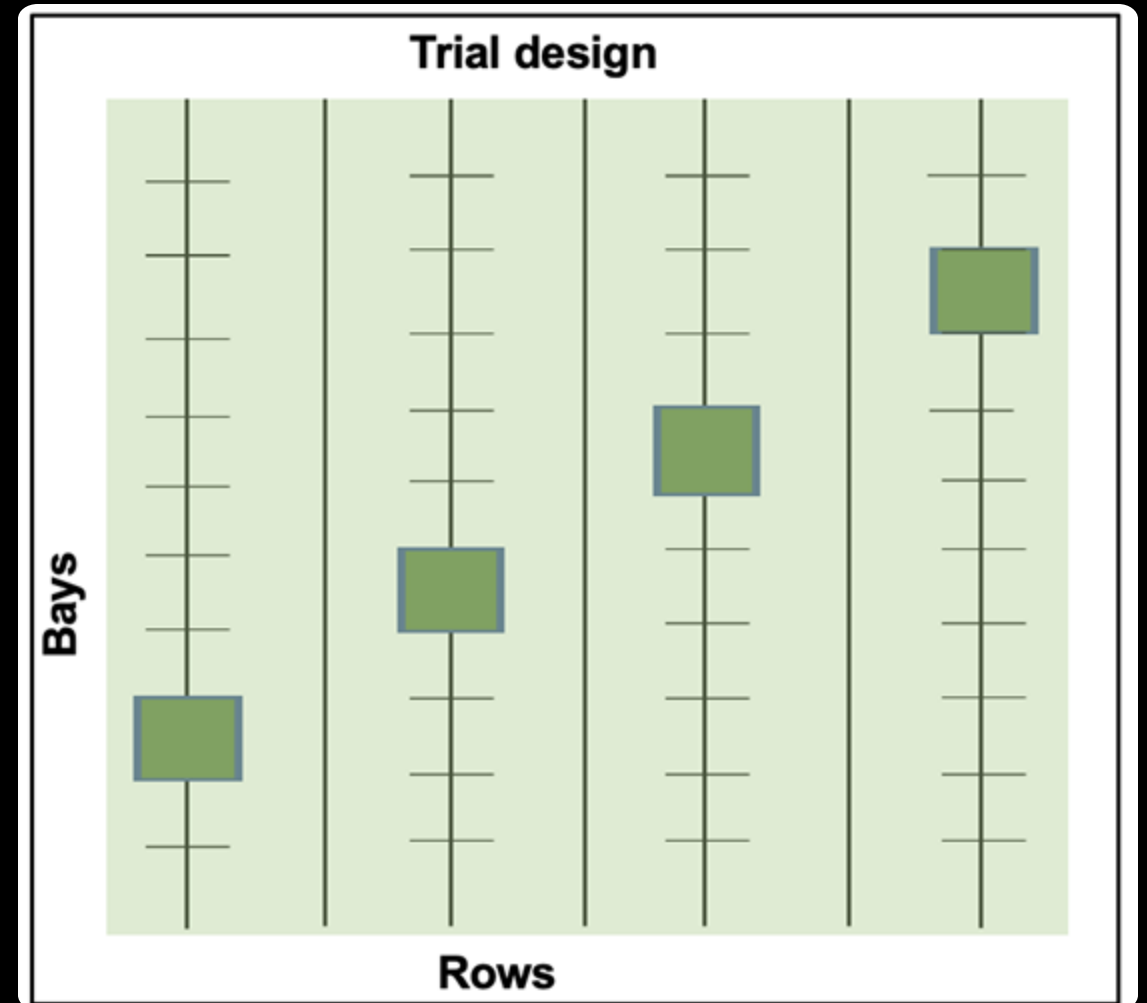
How do Chardonnay clones differ in terms of wine quality and composition?



What is the regional impact on wine characteristics?

# TRIAL DETAILS

- The trial originated in a Hawkes Bay vineyard with the intention of evaluating a number of viticultural aspects.
- Five clones were included in the study.
- This was extended to include a winemaking trial which will be tasted today.
- Grapes were also kindly sent from a Martinborough vineyard to assess regional differences in the wine.



Highlighted bays indicate trial bays. The same design was used for each clone.

1 Bay = 1 Biological repeat

# TRIAL DETAILS

- The clones which were included:
  - CI 95
  - CI 548
  - CI 1066
  - Mendoza
  - Calera
- The Martinborough vineyard unfortunately did not have any Calera available.
- These were harvested as close to the commercial harvest date as was practical.

Wine #	Clone	Vineyard	Trial harvest date
1	CI 95	Martinborough	20/03/2024
2	CI 548	Martinborough	20/03/2024
3	CI 1066	Martinborough	20/03/2024
4	Mendoza	Martinborough	20/03/2024
5	CI 95	Hawkes Bay	06/03/2024
6	CI 548	Hawkes Bay	12/03/2024
7	CI 1066	Hawkes Bay	06/03/2024
8	Mendoza	Hawkes Bay	06/03/2024
9	Calera	Hawkes Bay	12/03/2024

*Tasting order of the Chardonnay wines*

# CHARDONNAY BUNCH ARCHITECTURE

95



548



1066



Mendoza



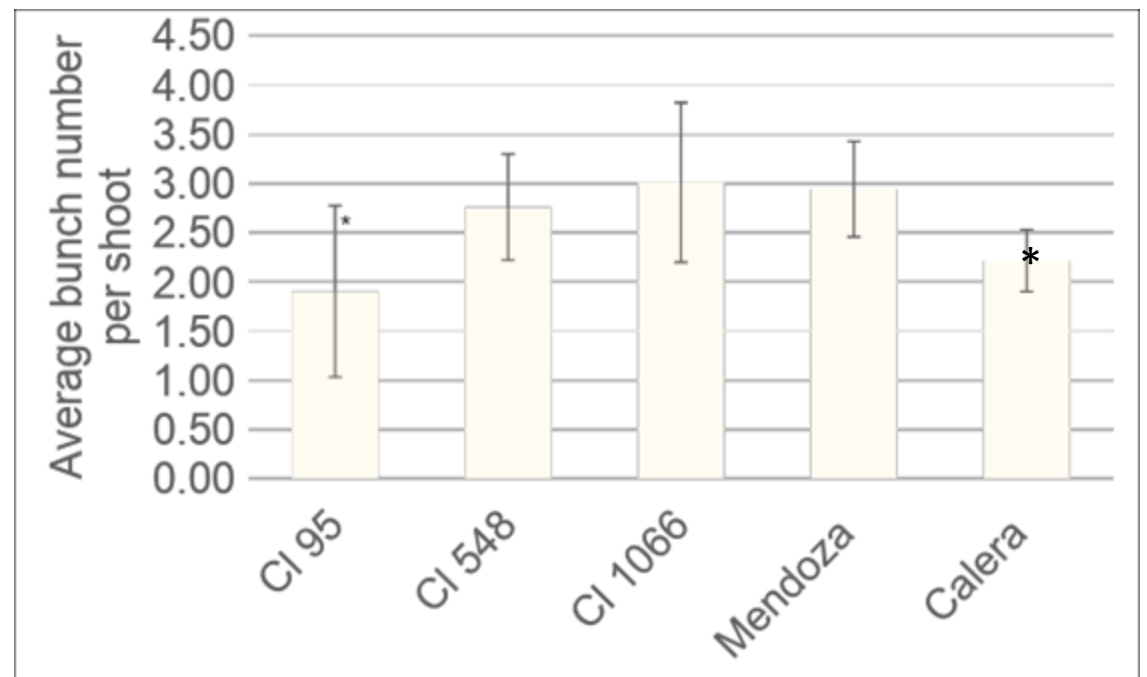
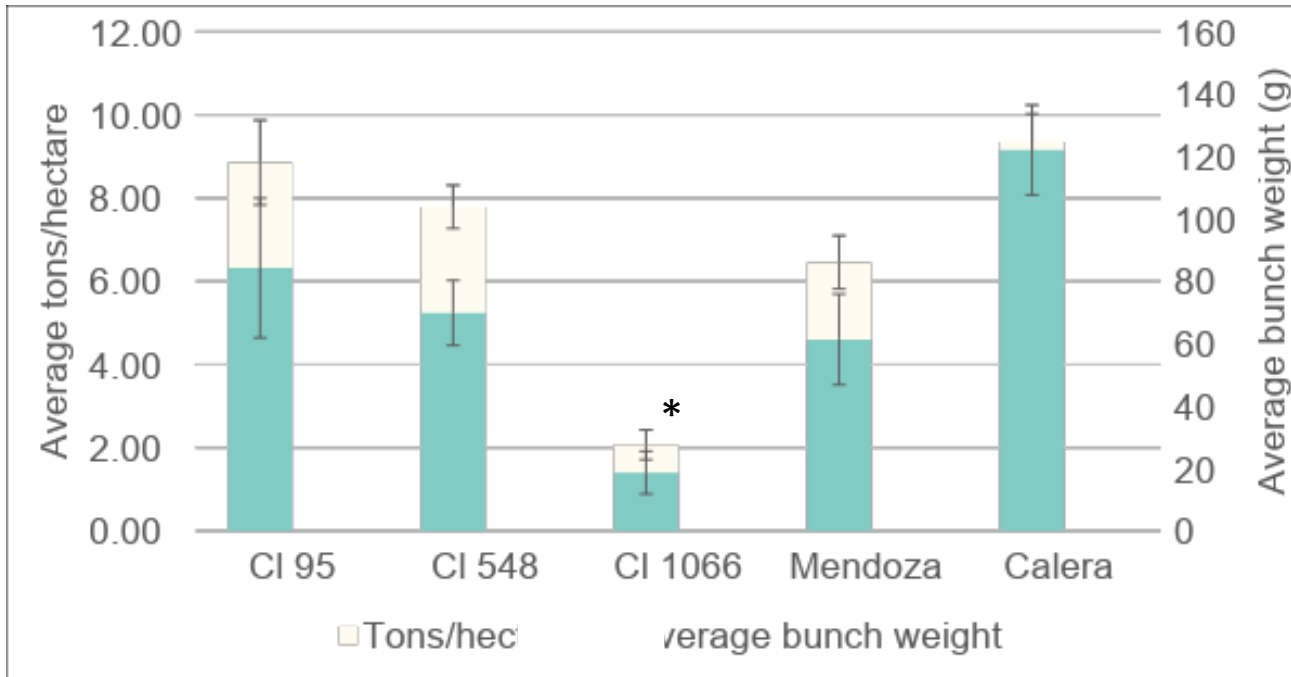
Calera



- Clone 1066 had significantly smaller berries and bunches.
- Mendoza bunches showed the characteristic hen and chicks with fairly open bunches.
- The other three clones were fairly similar with larger berries and bunches and a fairly open structure.

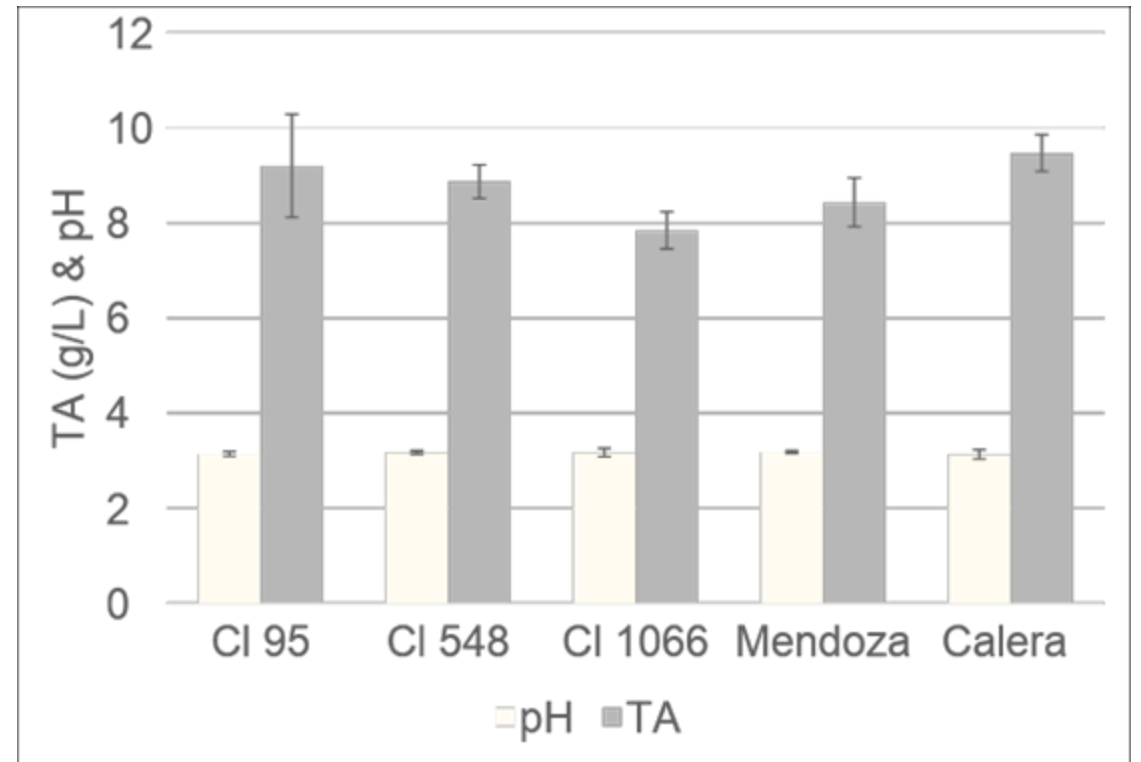
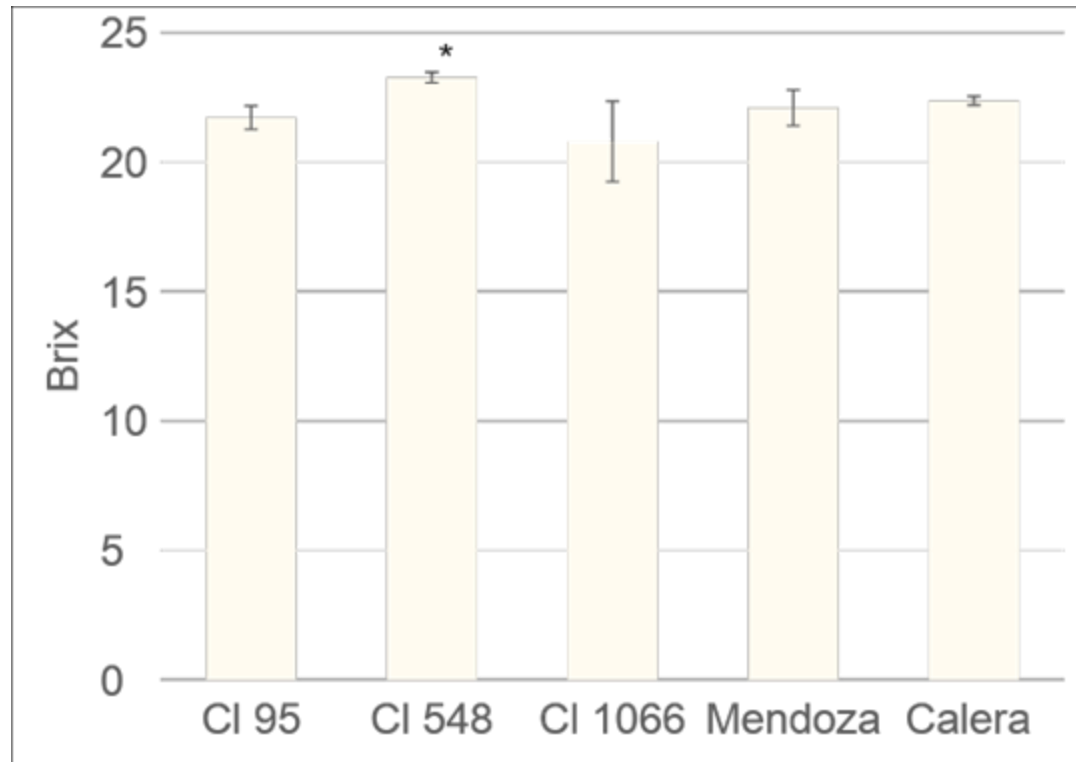


# HARVEST PARAMETERS – HAWKES BAY



- Clone 1066 was significantly lower yielding compared to the other clones while Calera was higher.
- Although not significant, Clone 1066 and Mendoza had higher bunch numbers per shoot – compensates for vine yield, most notably in Mendoza.
- Fairly good correlation between bunch weight and the final tons per hectare – this seems to be a main driver of yield.

## BERRY PARAMETERS AT HARVEST – HAWKES BAY



- Clone 548 reached a higher Brix level at harvest – 23.3°B.
- Clone 1066 had lowest TA at harvest, while the Calera had the highest



## VINEYARD PERSPECTIVES

95

Good yield with lower bunch numbers per shoot.  
The yield was more variable across samples.

548

Ripened quickly and reached the highest Brix levels at harvest.

1066

Lowest yielding cultivar due to small berries and bunch weight.  
Ripening seemed to stall and reached the lowest Brix level with higher TA.

Mendoza

The typically lower bunch weight of Mendoza seemed to be compensated for by higher bunch numbers per shoot.

Calera

Calera yield was the highest at harvest with large bunches.  
Calera ripened more slowly and maintained acids for longer.

# CHARDONNAY MICROVINS



Grapes were harvested as close to commercial harvest date as was practical



These were processed at the EIT winery.



Grapes were crushed, destemmed and pressed.



Inoculated with EC-1118 yeast and fermented until dry.



Wines underwent cold stabilisation.



Coarse filtration was done prior to bottling.

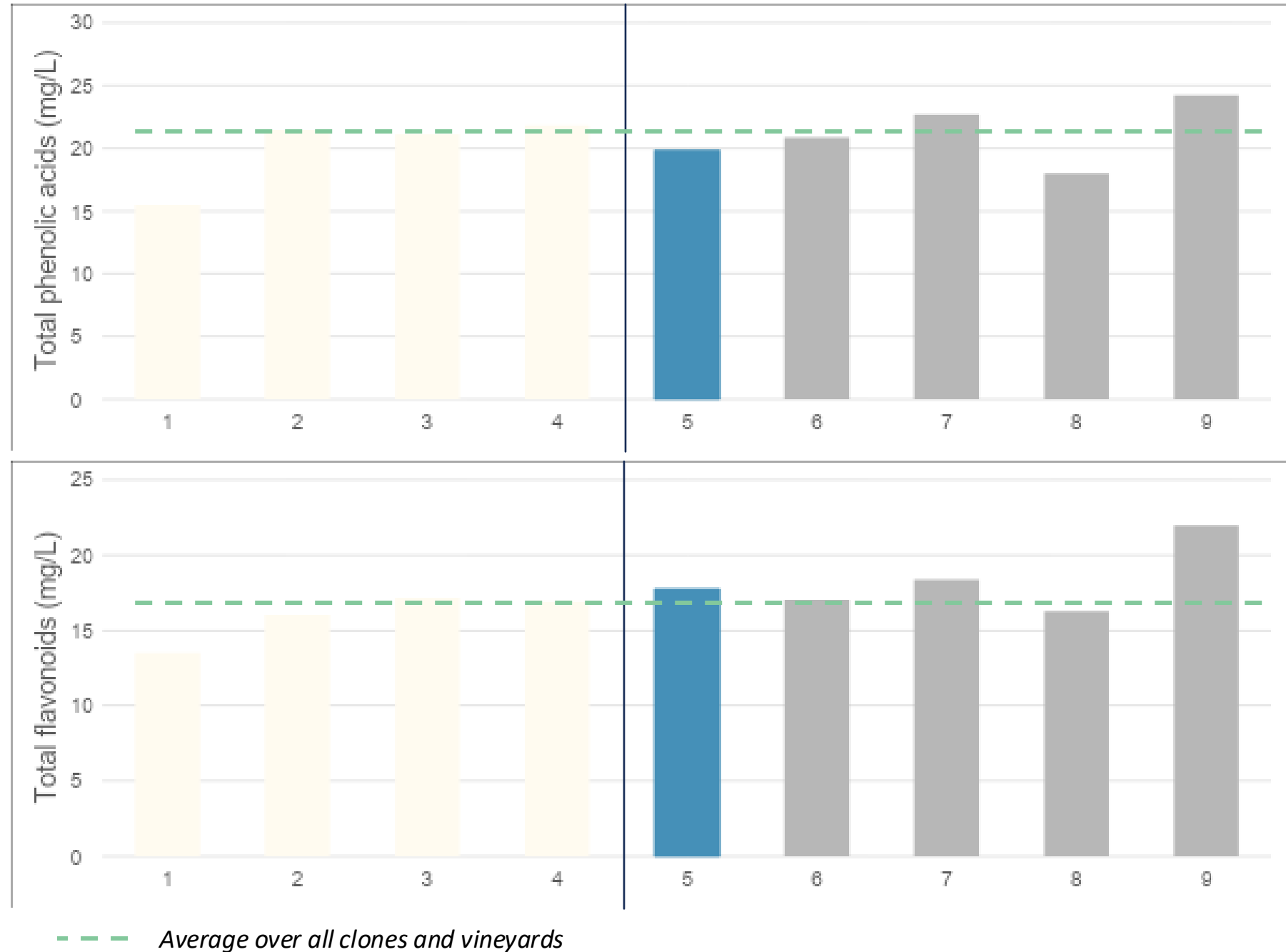
- Basic analysis carried out
- Samples sent to Auckland University for phenolic compound analyses.

# PHENOLIC COMPOUNDS

<b>Hydrobenzoic acids</b>	gallic acid
	syringic acid
<b>Hydroxycinnamic acids</b>	caftaric acid
	Caffeic acid
	Coutaric acid
	p-coumaric acid
	Ferulic acid

(+)-catechin
(-)-epicatechin

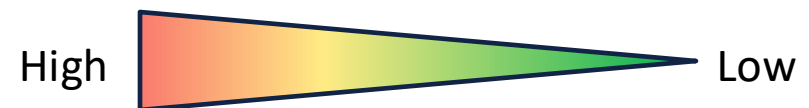
- The Hawkes Bay vineyard showed higher phenolic acids and flavonoids overall.
- Regional difference is stronger than clonal influence



# THE FLAVONOIDS - CATECHIN AND EPICATECHIN

- Catechin
  - Clone 1066 seemed to have higher levels in both vineyards.
  - Mendoza showed lower levels over both sites.
- Epicatechin
  - Highest levels in Hawkes Bay.
  - Clone 1066 again showed higher levels in both vineyards with Mendoza on the lower side.
  - Calera also showed higher levels.

Vineyard	Clone	Catechin	Epicatechin
Martinborough	Cl 95	4.44	19.79
Martinborough	Cl 548	6.78	30.99
Martinborough	Cl 1066	7.85	33.31
Martinborough	Mendoza	3.40	23.33
Hawkes Bay	Cl 95	7.58	37.95
Hawkes Bay	Cl 548	4.41	40.35
Hawkes Bay	Cl 1066	7.71	42.11
Hawkes Bay	Mendoza	3.15	35.94
Hawkes Bay	Calera	5.18	41.19

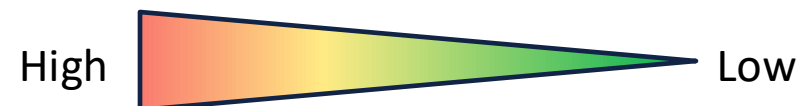


*Catechin and Epicatechin reported in mg/L wine*

# THE FLAVONOIDS - CATECHIN AND EPICATECHIN

- Catechin and epicatechin are both types of flavonoids.
- They are stereoisomers, meaning they have the same molecular formula but differ in their arrangement.
- Both compounds have antioxidant properties and would be increased under conditions of stress, e.g. higher light, temperature, water deficit etc.
- These compounds are precursors to condensed tannins (also known as proanthocyanidins) in grapes and wine.

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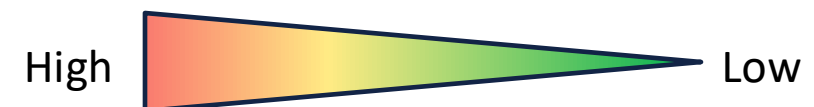


*Catechin and Epicatechin reported in mg/L wine*

# THE FLAVONOIDS - CATECHIN AND EPICATECHIN

- Catechins contribute to the bitterness and astringency and can create a smoother texture in aged wines, leading to softer, rounder mouthfeel.
- Epicatechins also affect the bitterness and mouthfeel, but to a lesser extent compared to catechins.
- Their polymerization plays a role in the overall complexity and structure of wine.
- They may potentially preserve certain aroma molecules (e.g., esters) from oxidative degradation.

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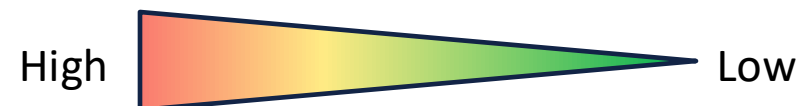


*Catechin and Epicatechin reported in mg/L wine*

# THE PHENOLIC ACIDS

- The Hawkes Bay site had higher levels of phenolic acids overall.
- Hydroxycinnamic acids
  - Calera showed notably higher levels.
  - Clone 1066 showed higher levels in both vineyards
  - Mendoza levels were on the lower side over both sites.
- Hydroxybenzoic acids
  - Clone 548 in the Martinborough vineyard was notably high compared to the other wines.
  - Slightly higher in Martinborough Mendoza, but lowest in HB Mendoza
  - Clone 1066 showed higher levels, mostly in the HB site.

Vineyard	Clone	Hydroxycinnamic acids	Hydroxybenzoic acids
Martinborough	CI 95	13.52	2.00
Martinborough	CI 548	16.05	5.41
Martinborough	CI 1066	17.20	3.92
Martinborough	Mendoza	16.94	4.91
Hawkes Bay	CI 95	17.76	2.09
Hawkes Bay	CI 548	17.04	3.82
Hawkes Bay	CI 1066	18.38	4.33
Hawkes Bay	Mendoza	16.28	1.76
Hawkes Bay	Calera	21.96	2.29



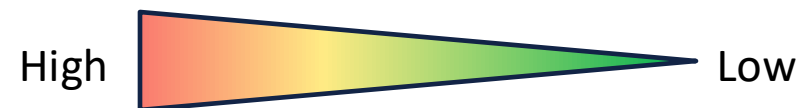
*Hydroxycinnamic acids and hydroxybenzoic acids reported in mg/L wine*



# THE PHENOLIC ACIDS

- The phenolic acids compounds serve a protective role in grapes and will be influenced by vineyard stress factors. e.g. higher light, temperature, water deficit etc.
- Protect against UV induced damage.
- Act as antioxidants and scavenge free-radicals.
- Prevent oxidative damage to cells.

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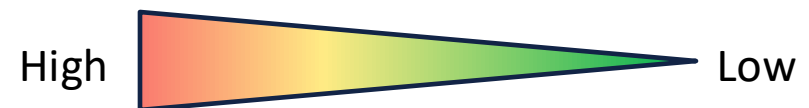


*Hydroxycinnamic acids and hydroxybenzoic acids reported in mg/L wine*

# THE PHENOLIC ACIDS

- Hydroxybenzoic acids impart bitterness and slight astringency, though these effects are more subtle compared to tannins.
- Hydroxycinnamic acids can influence and contribute to both fruity and spicy aromas.
- These acids are also highly susceptible to oxidation.
  - The o-quinones which form from oxidation can react with thiols present in the wine.
  - This reaction can "trap" thiols, effectively reducing their ability to impart their characteristic fruity and tropical aromas to the wine.

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*Hydroxycinnamic acids and hydroxybenzoic acids reported in mg/L wine*

## WINE PERSPECTIVES

95

Clone 95 displayed a higher concentration of flavonoids in the HB site. Levels were lower in the Martinborough site compared to other wines.

548

Notably higher levels of hydroxybenzoic acids in the Martinborough vineyard compared to the other wines.

1066

High levels of phenolic compounds in wines made from both vineyards

Mendoza

Showed lower levels of phenolic compounds overall.

Calera

High levels of phenolic compounds, most notably the hydroxycinnamic acids.

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# IN CONCLUSION

The vineyard region had the most significant influence on grape and wine composition.

The different clones did display differences in yield parameters and composition, sometimes consistently across sites but with a fair amount of variability between vineyards

The clones would therefore contribute to final wine style, but this may differ from one region to the next.



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- Reagan Braglio

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HAWKE'S BAY WINE  
NEW ZEALAND



New Zealand Wine  
Altogether Unique.

- Hawkes Bay Wine

Thank you for your attention.

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