

Chemical and physical measures of grape/wine quality

Grape quality = wine quality

Acknowledgements

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What are we talking about ?

Juice measures

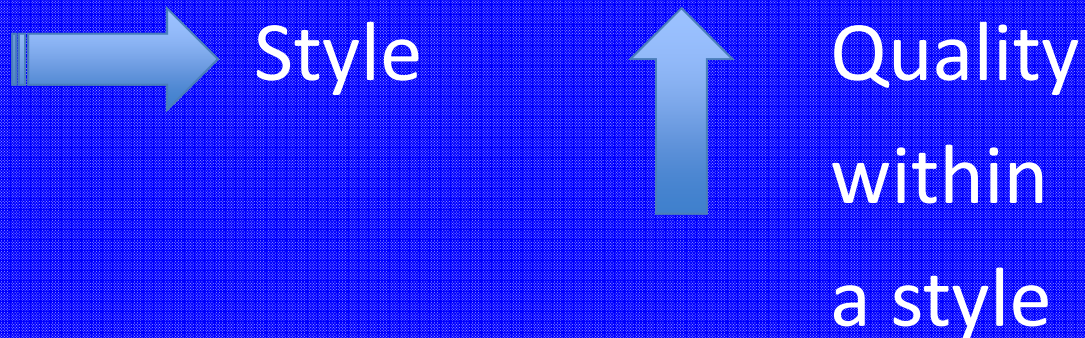
- °Baumé
- pH
- Titratable acidity (TA)

Berry measures

- berry weight
- seed weight
- skin weight
- seed colour
- skin colour

How far can these measures take us?

Depends on who we are going with
and where we are going !



Who and where are we going?

- Shiraz
- Warm to hot climate

Highly coloured, full-bodied red wine with some raspberry and spice, intense plum and mulberry aroma characters, expressive, but soft, puckering tannins, rich and balanced and displaying good flavour length.

Some measures can act as a guide

°Baumé

13.5

pH

4.0

TA

4.0

Logic 101

All mexicans have big hats

He is a mexican

Therefore he has a big hat

All mexicans have big hats

He has a big hat

Therefore he is a mexican

Logic 101

All high quality wines were made from grapes with
>13.5 °Baumé

This is a high quality wine

Therefore it was made from grapes with >13.5 °Baumé

All high quality wines were made from grapes with
>13.5 °Baumé

This wine was made from grapes with >13.5 °Baumé

Therefore it is a high quality wine.

Seed colour



What are we talking about ?

Juice measures

- °Baumé
- pH
- Titratable acidity (TA)

Berry measures

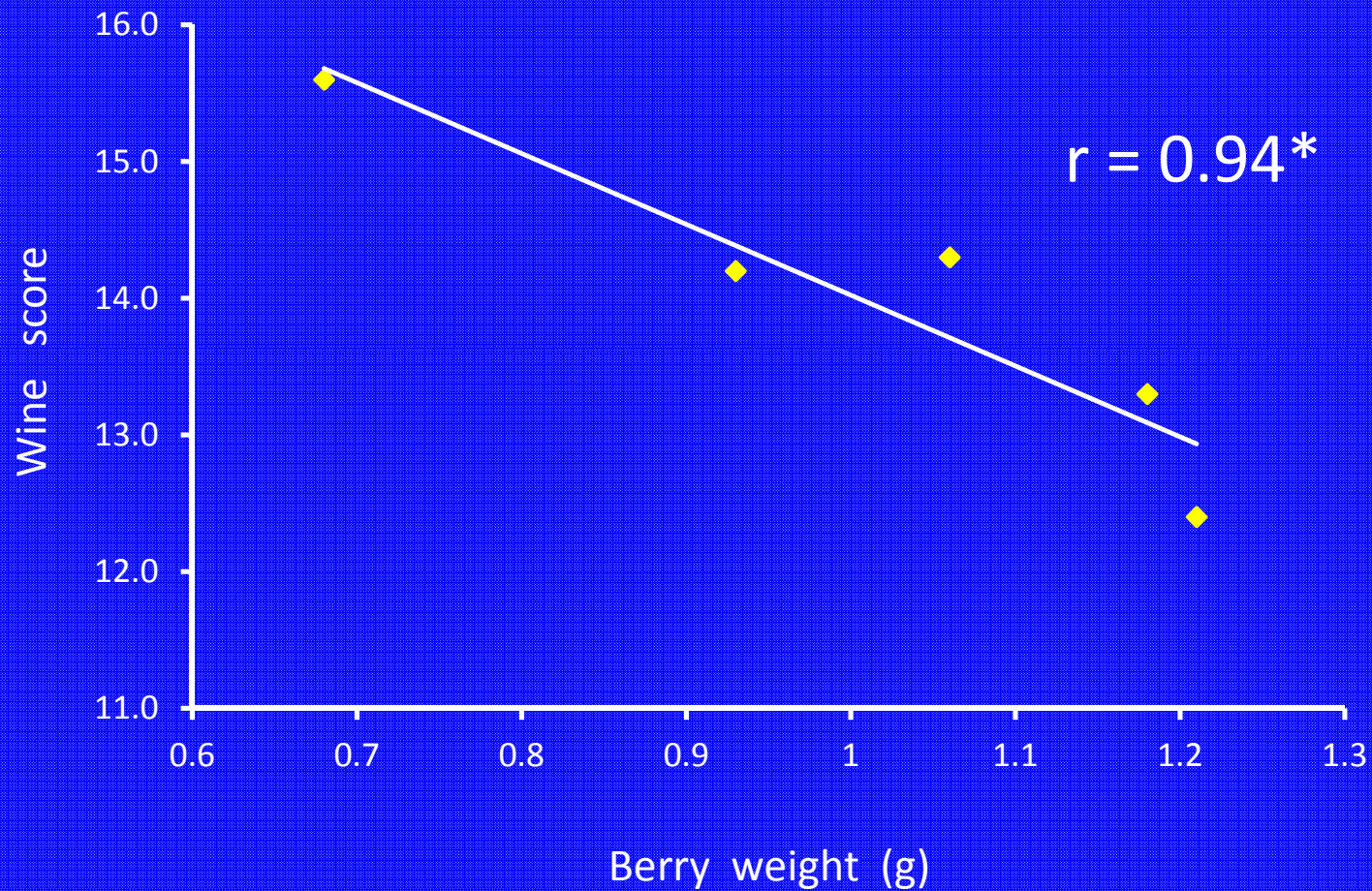
- berry weight
- seed weight
- skin weight
- seed colour
- skin colour

How far can berry measures take us towards predicting grape /wine quality?

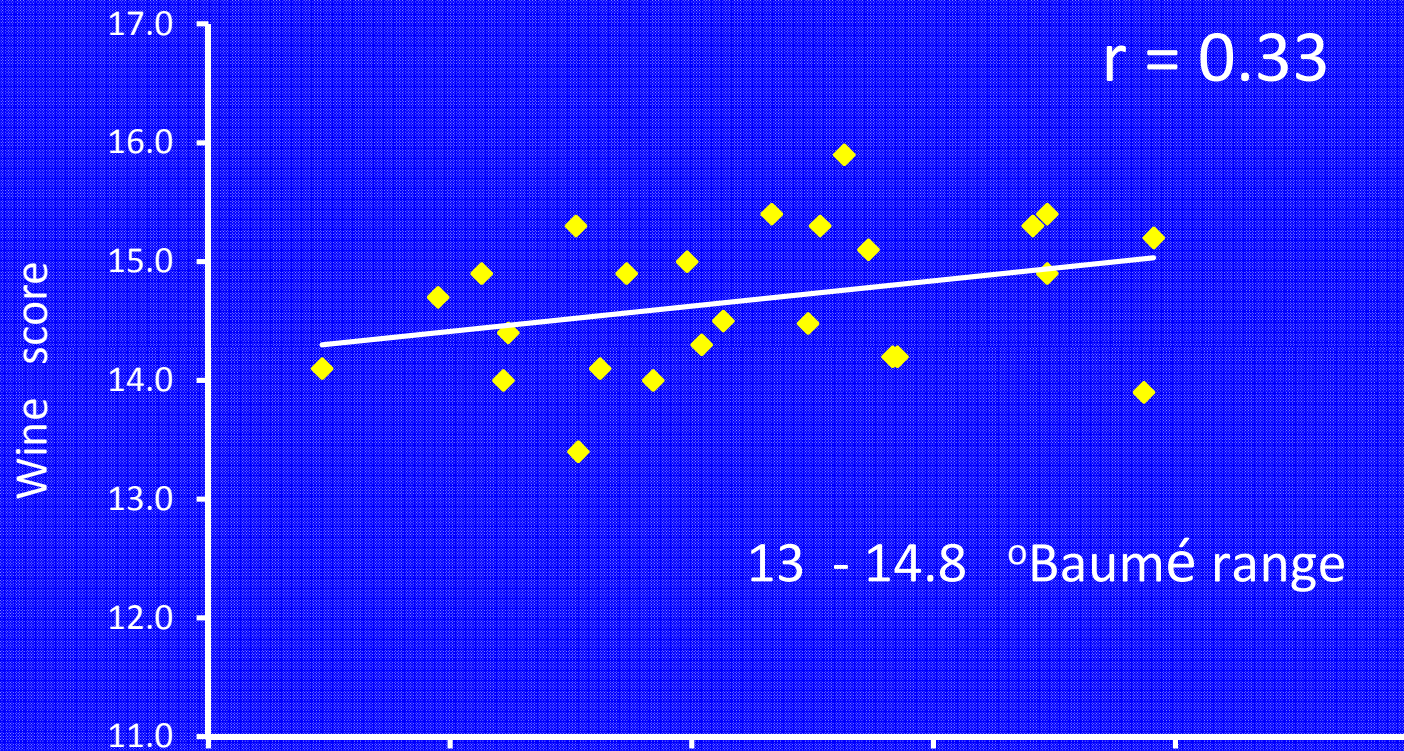
To find out we need to —



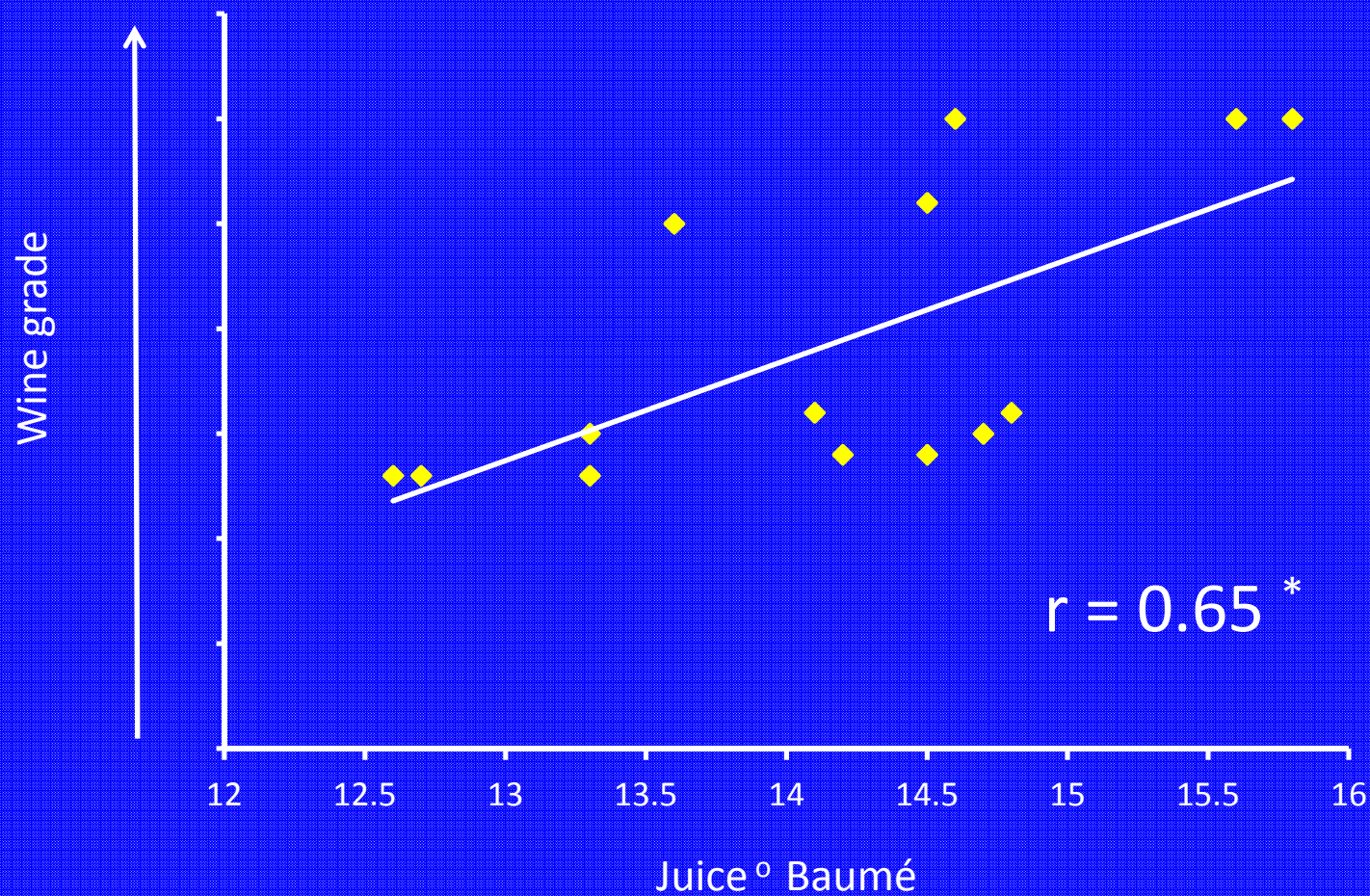
Shiraz, Riverland — Berry weight v Wine score



Shiraz, warm and hot regions — Berry colour v Wine score



Shiraz, Barossa Valley — °Baumé v Wine grade



Message

- The larger the range of juice °Baumé the greater the likelihood of a relationship between juice °Baumé and wine quality rating.
- Relationships between berry attributes and wine quality rating should be assessed within a set narrow juice °Baumé range as practically possible.

How do we decide if a measure is a good predictor?

- Consistent result over several studies

Selected studies — Shiraz

Study			Data points
1	year 1	canopy shading (Barossa Valley)	8
	year 2		4
2	year 1	irrigation study (Riverland)	8
	year 2		8
3	year 1	different vineyards (Riverland)	5
4	year 1	different vineyards (Barossa Valley)	12
	year 2		14
5	year 1	different vineyards (warm and hot areas)	25

the X factor

Hello!
My name is
Baumé
This is my
story...



Judge's Table

Study

1 <

2 <

3 -

4 <

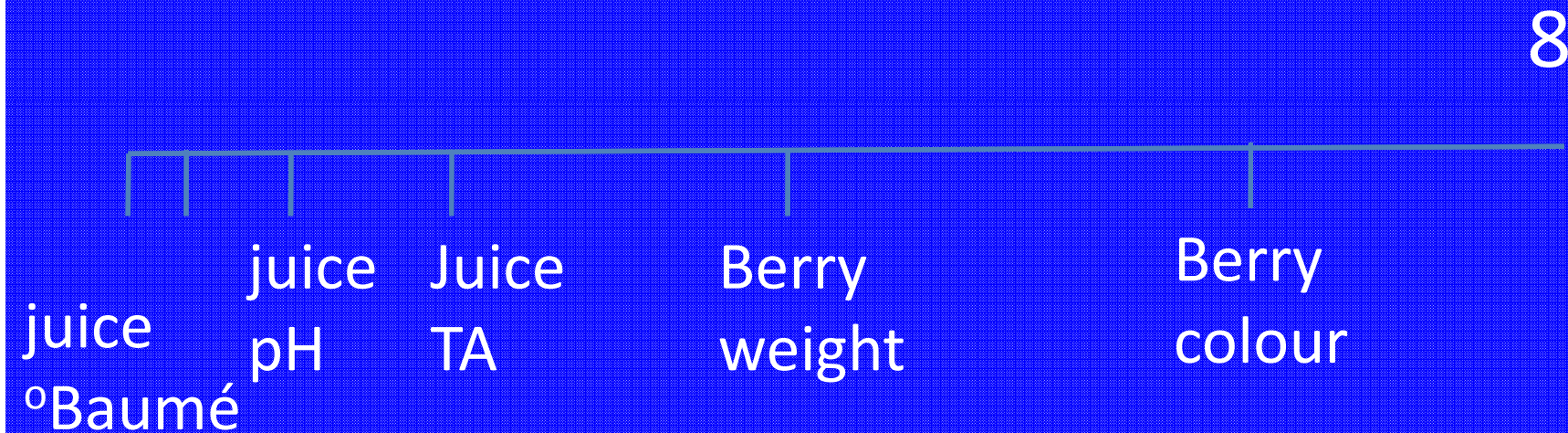
5 -

Measures that
DID NOT
act as good indicators

Juice °Baumé, pH, TA
seed weight, skin weight
visual seed colour, visual skin colour
berry weight

Summary

Quality rating — how far can we go?



The measure that
DID
act as a good indicator

chemical measure of berry colour

Black
grapes

skin colour



Berry colour — chemical analysis

- A sample of berries
- Homogenised
- Portion extracted with ethanol solution
- Acid adjusted
- Colour measured on a spectrophotometer/NIR
- Value expressed as mg/g berry weight

Berry colour

Determined by chemical analysis

Shiraz



Skin colour / Berry colour

Determined by chemical analysis

Yes

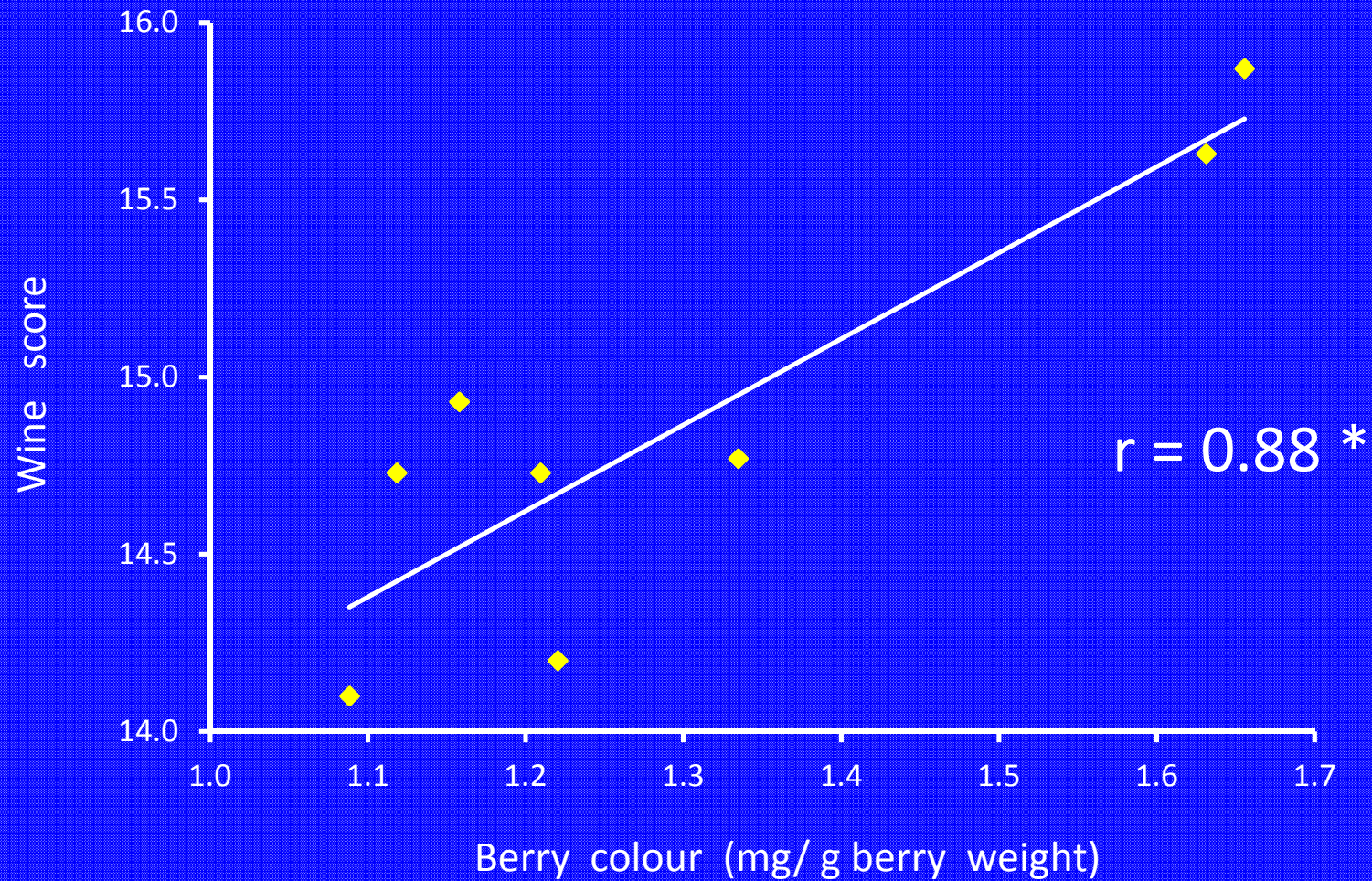
No

6/8

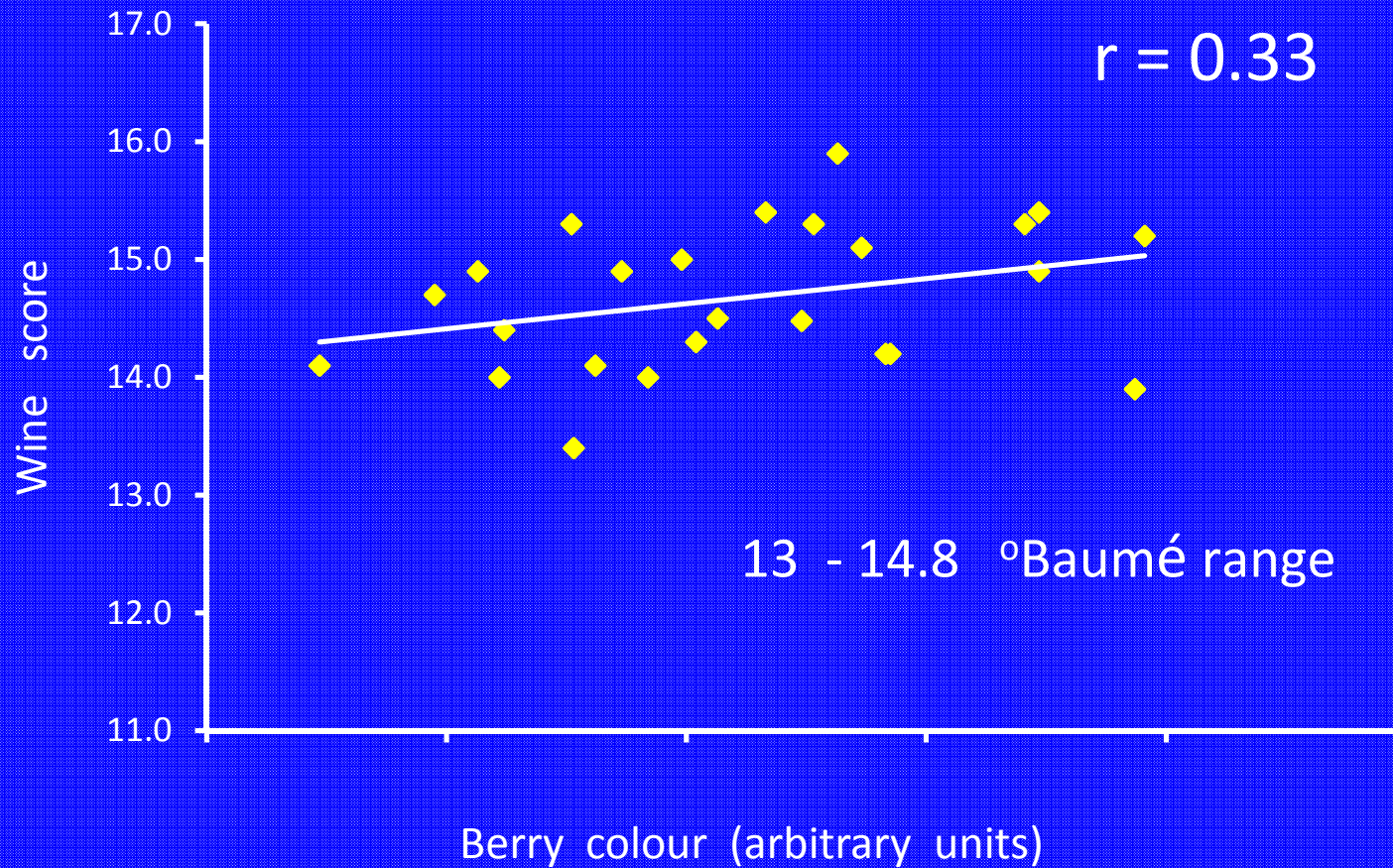
2/8

positive trends

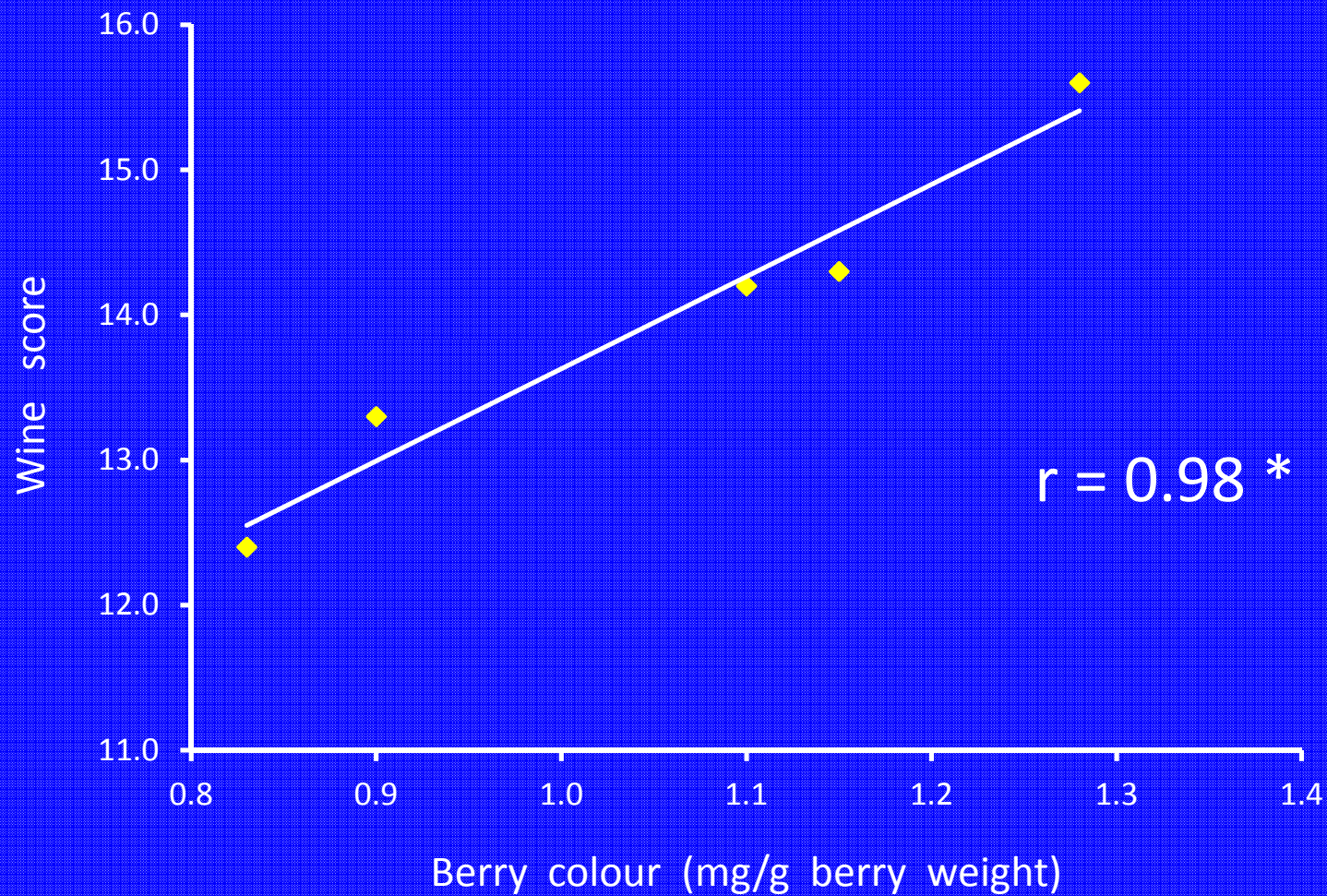
Shiraz, Barossa Valley — Berry colour v Wine score



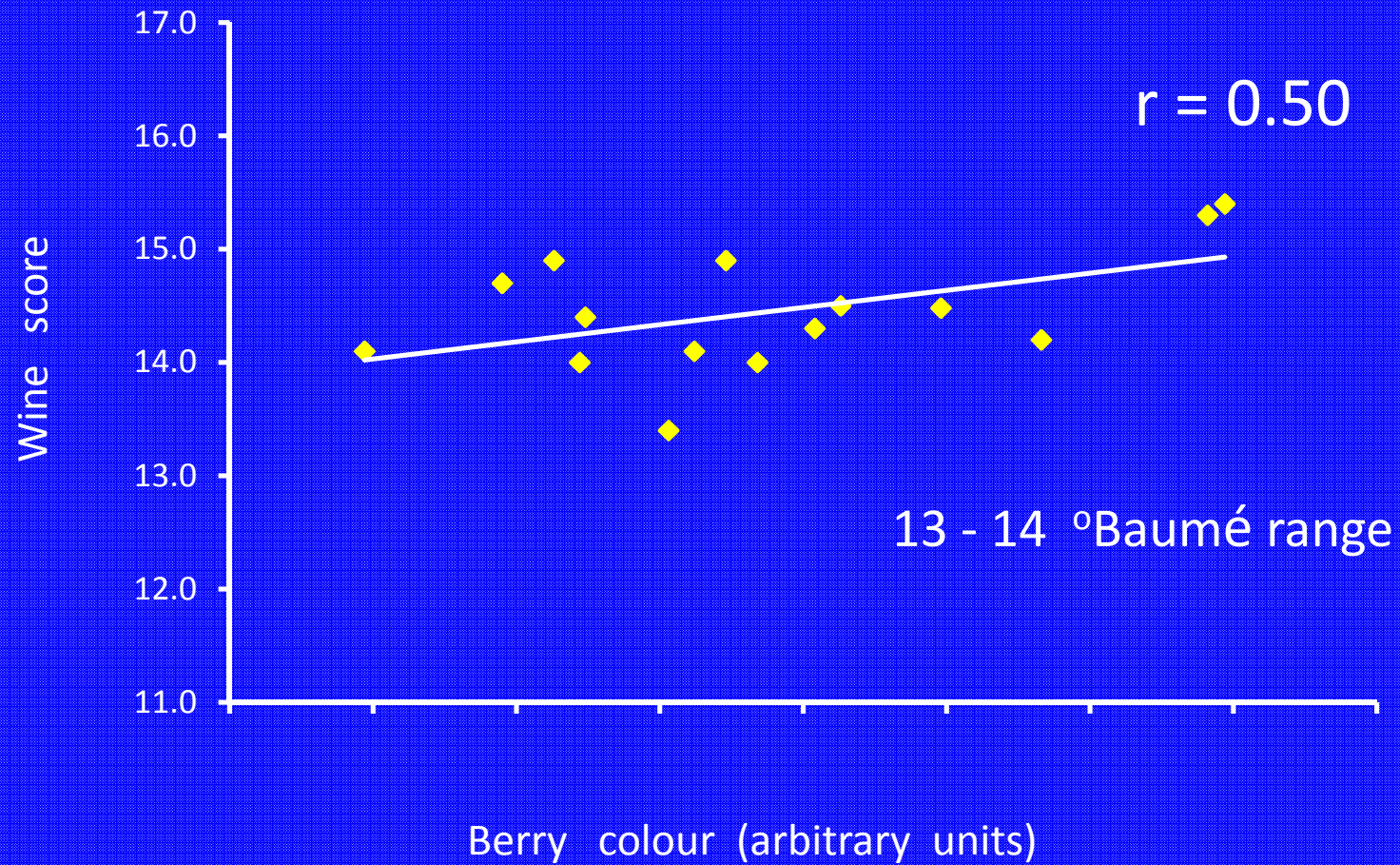
Shiraz, warm and hot regions — Berry colour v Wine score



Shiraz, Riverland — Berry colour v Wine score



Shiraz, warm and hot regions — Berry colour v Wine score



Industry experience

- BRL Hardy
- Brown Brothers

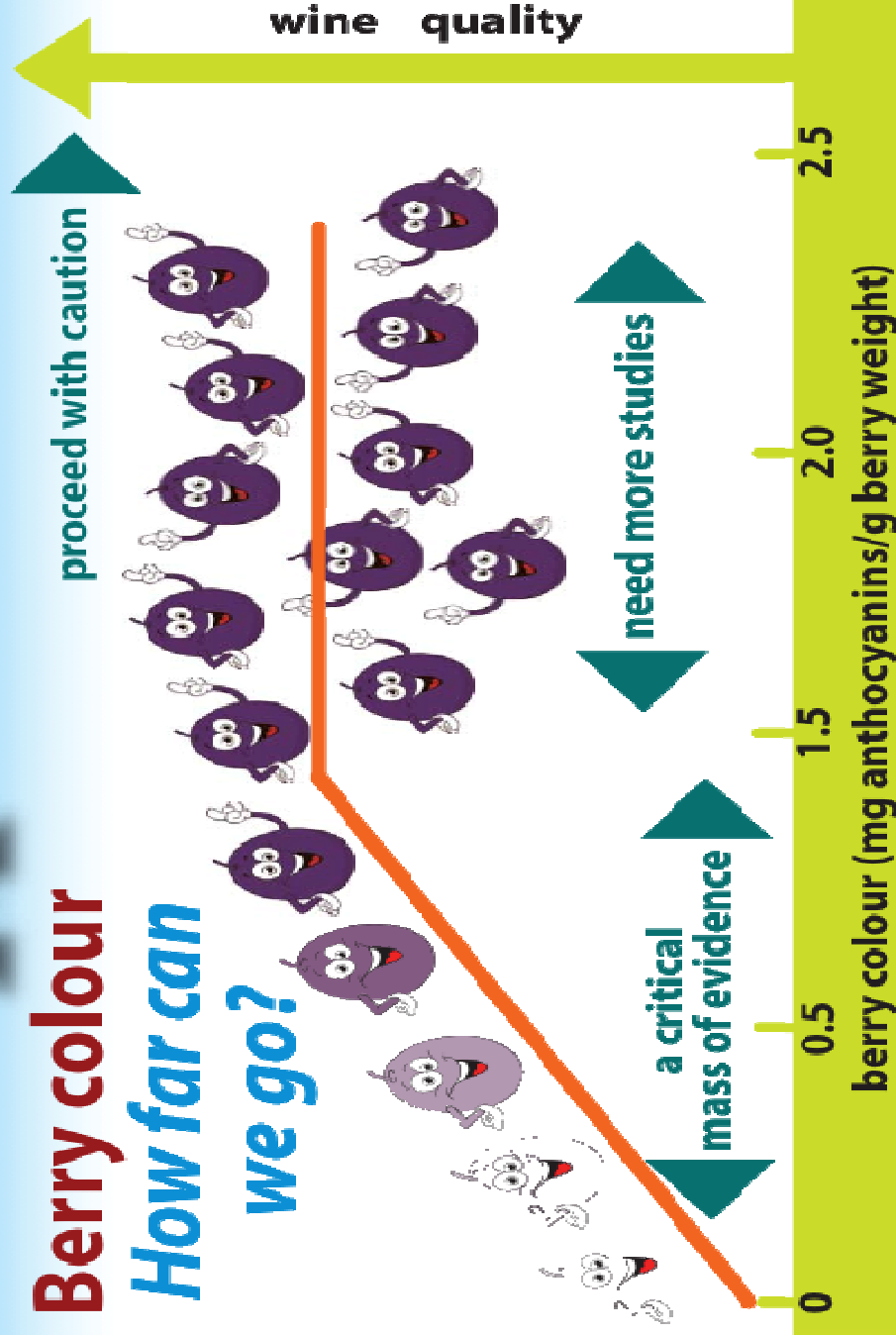
Berry colour – how far can we go?

Study	berry colour (mg/g)	wine score
1 year 1	1.1 – 1.7	14.1 - 15.9
year 2	1.0 - 2.2	14.5 - 16.6
2 year 1	1.4 - 1.6	low to medium
year 2	0.9 - 1.3	low to medium
3 year 1	0.8 - 1.3	12.4 - 15.6
4 year 1	1.3 - 1.7	medium to high
year 2	0.7 - 1.4	medium to high
5 year 1	low to medium	13.4 - 15.9

the X factor

Shiraz
warm & hot climates
full-bodied red wine

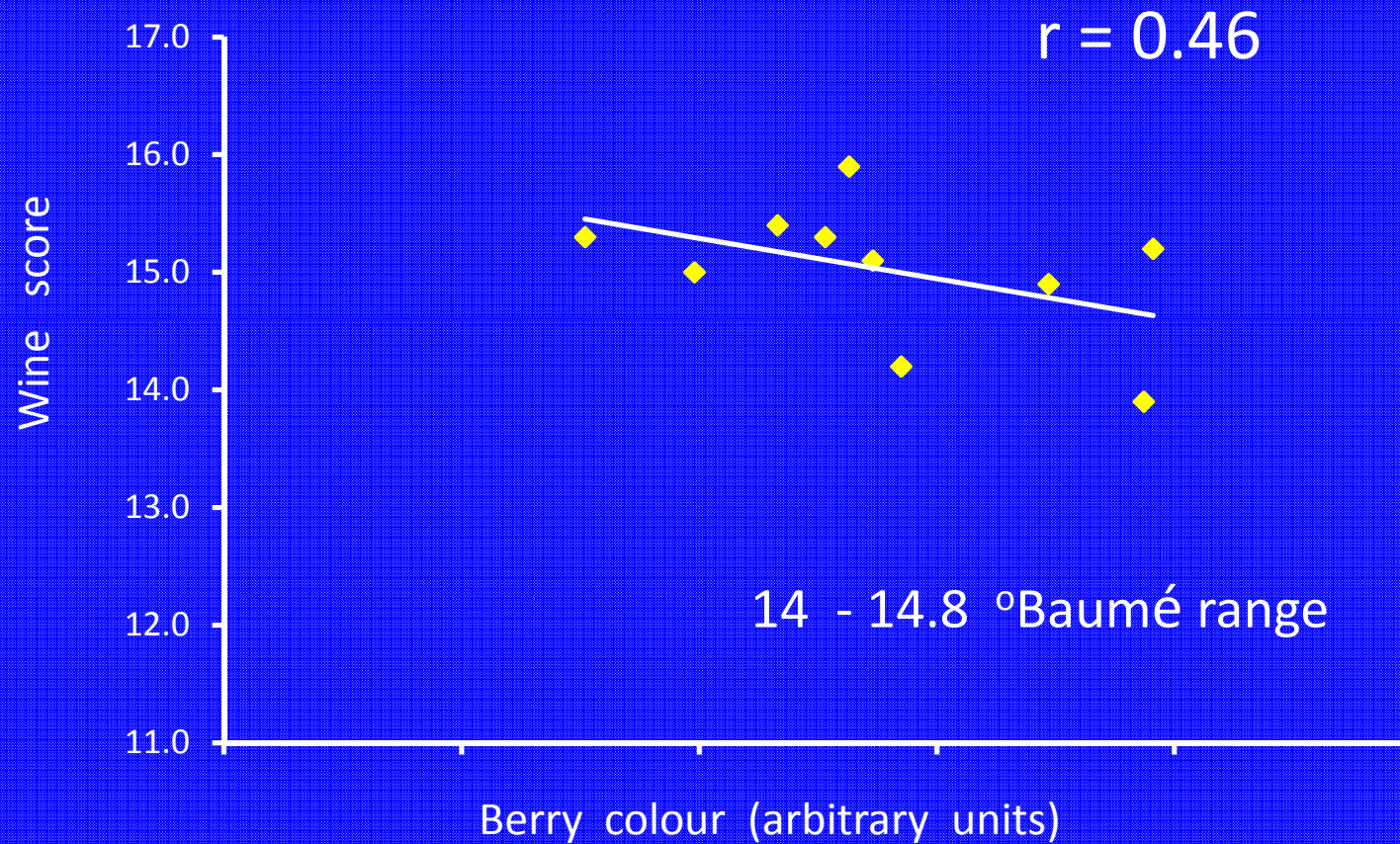
Berry colour
How far can
we go?



Message — Berry colour

Berry colour acts
as a good predictor of wine quality
in the low to medium range of berry colour
for, in this case, Shiraz.

Shiraz, warm and hot regions — Berry colour v Wine score



Berry shrivel



Berry size/weight

- Berry size (cm)
- Berry weight (grams)

Berry weight

Yes

2/8

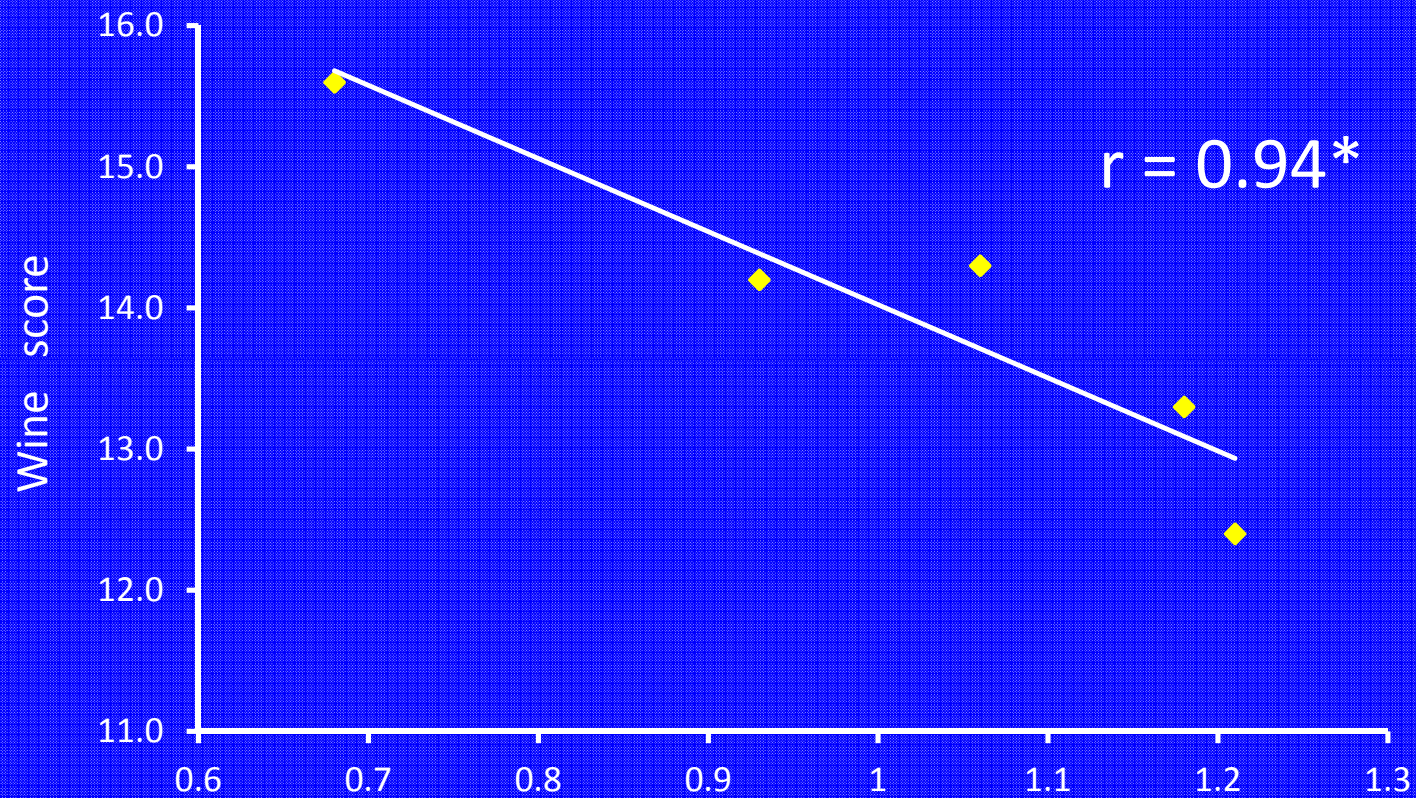
No

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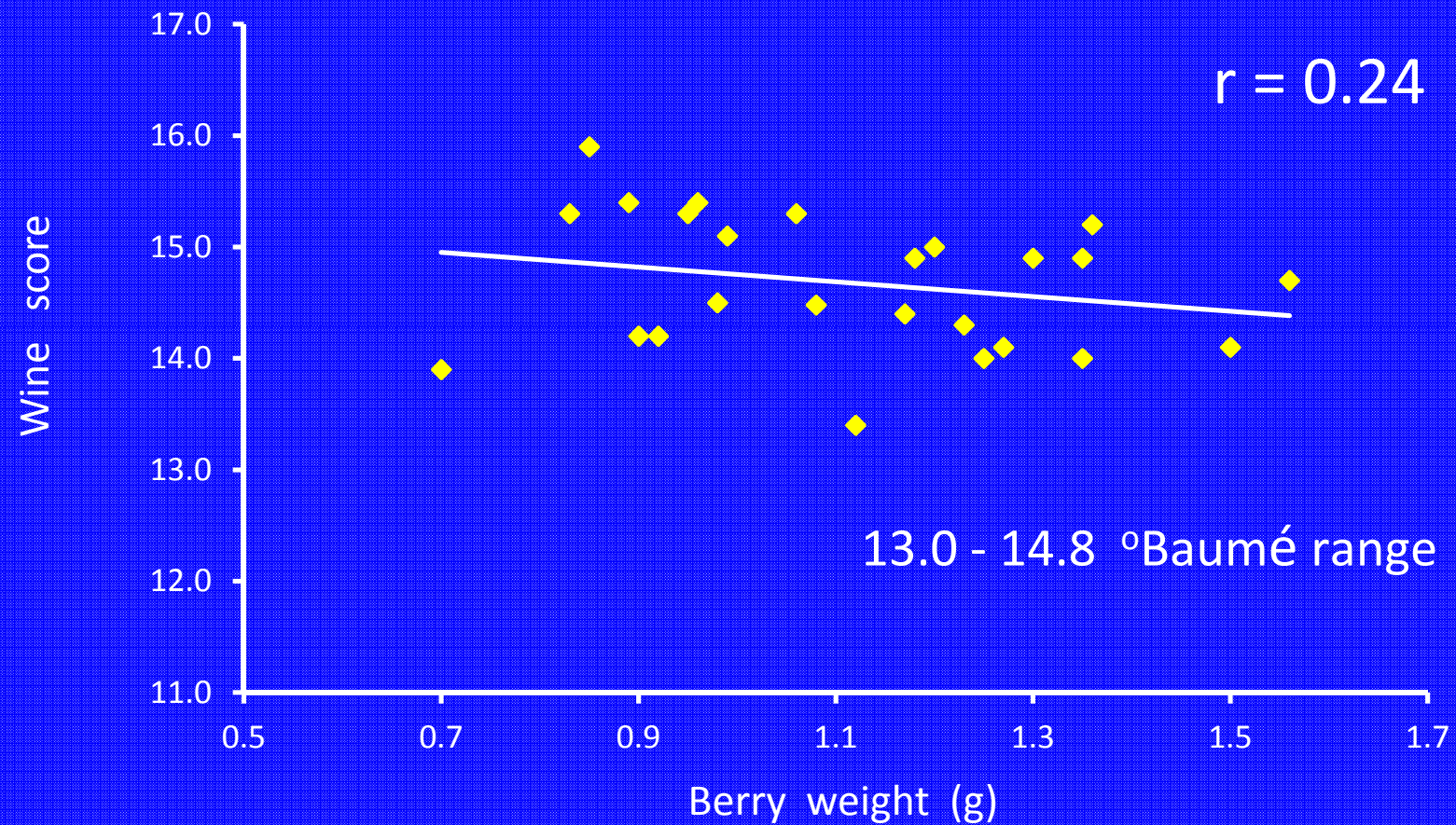
negative

but of these
3 showed
negative trends

Shiraz, Riverland — Berry weight v Wine score



Shiraz, warm and hot regions — Berry weight v Wine score

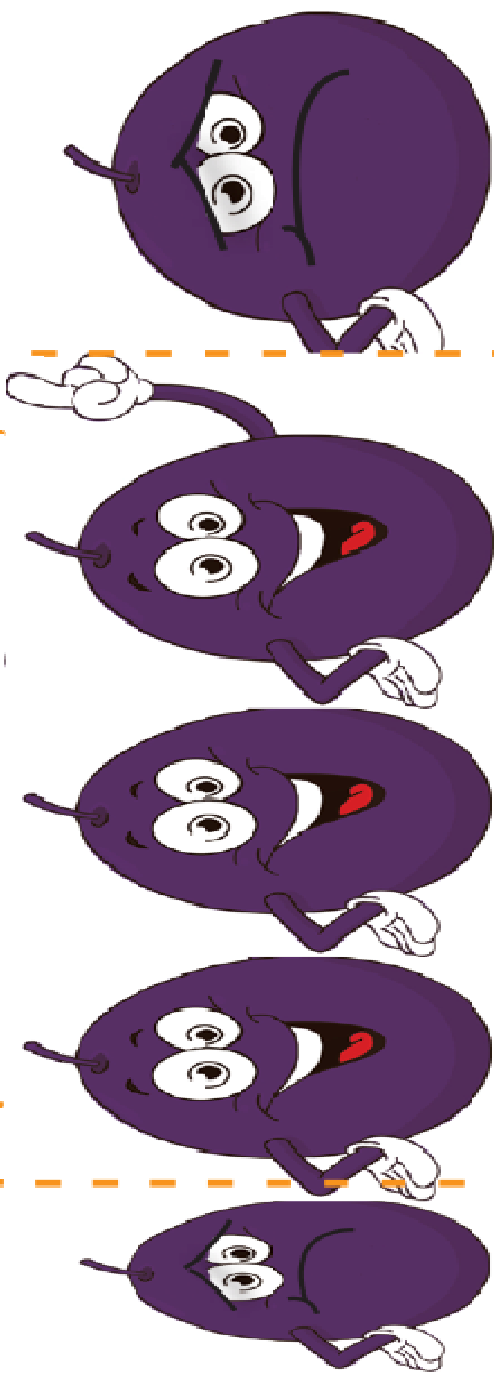


Berry shrivel



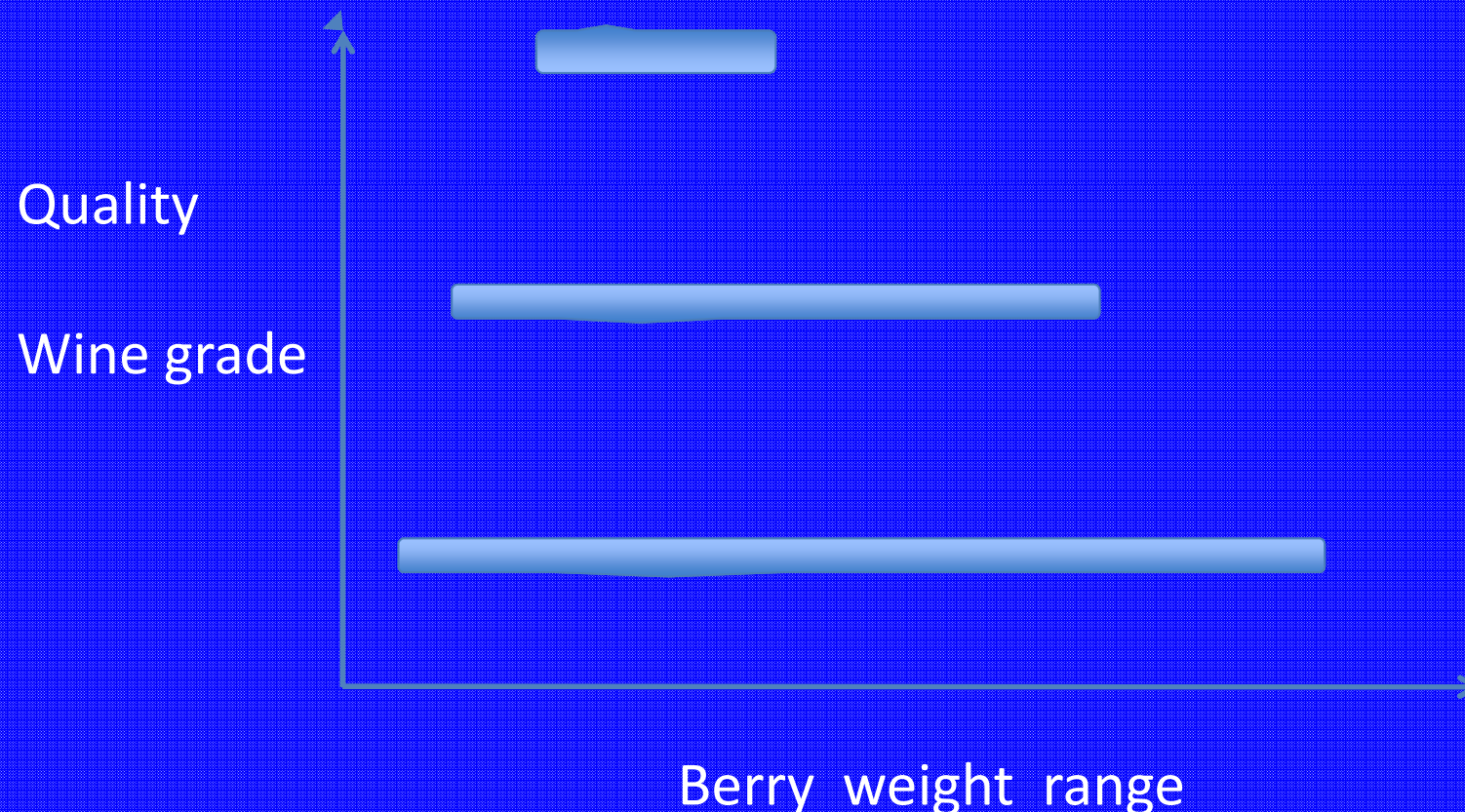
the **X**factor

optimum range



Shiraz, Barossa Valley — Berry weight v Wine grade

lower wine quality was associated with smaller or larger berries
higher wine quality was associated with relatively smaller berries



Message

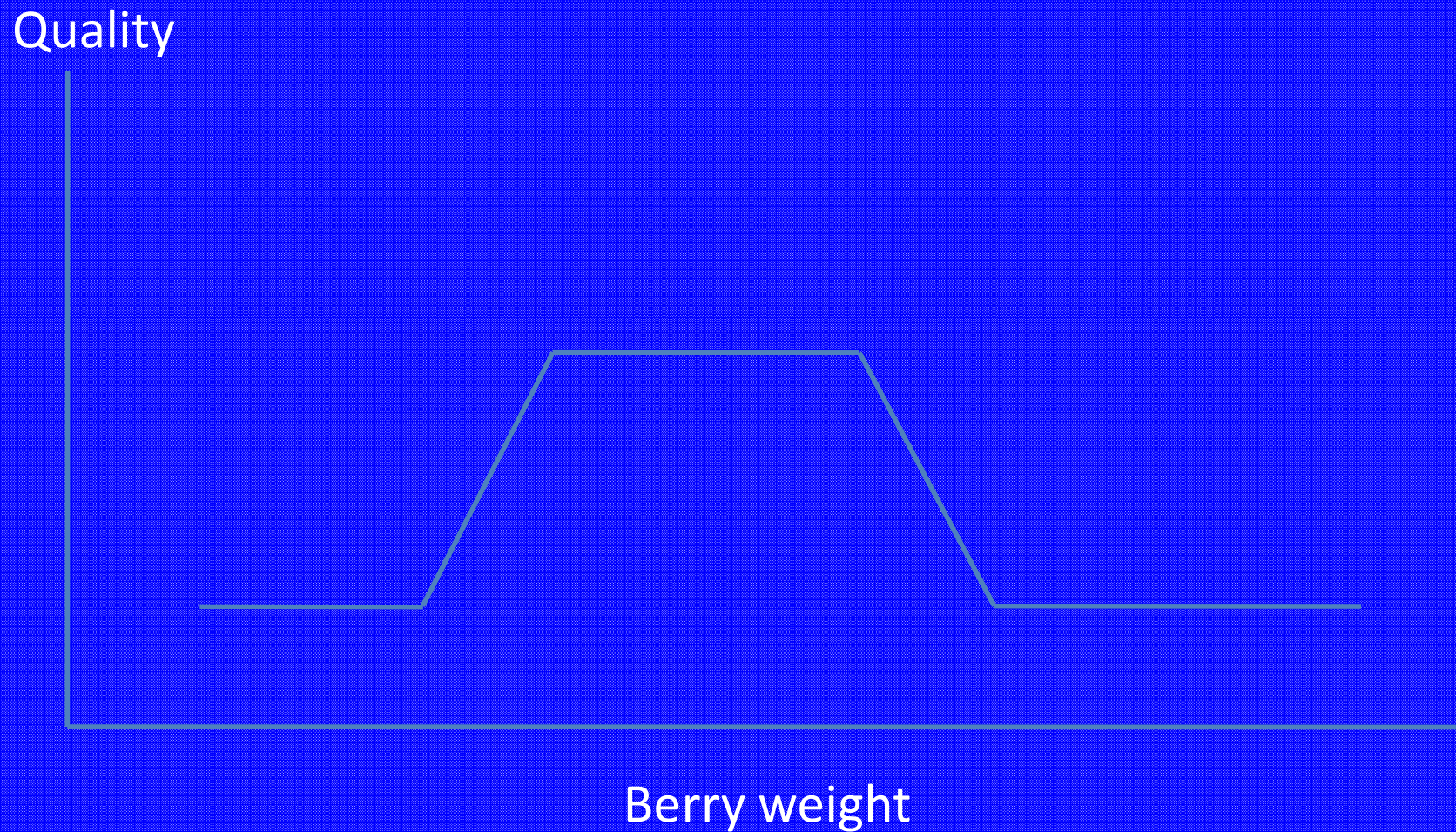
(full bodied Shiraz)

lower wine quality was associated with
smaller or larger berries

higher wine quality was more likely
to be associated with relatively
smaller rather than larger berries

but the smallest berries are not necessarily the best
(be aware of berry shrivel effects)

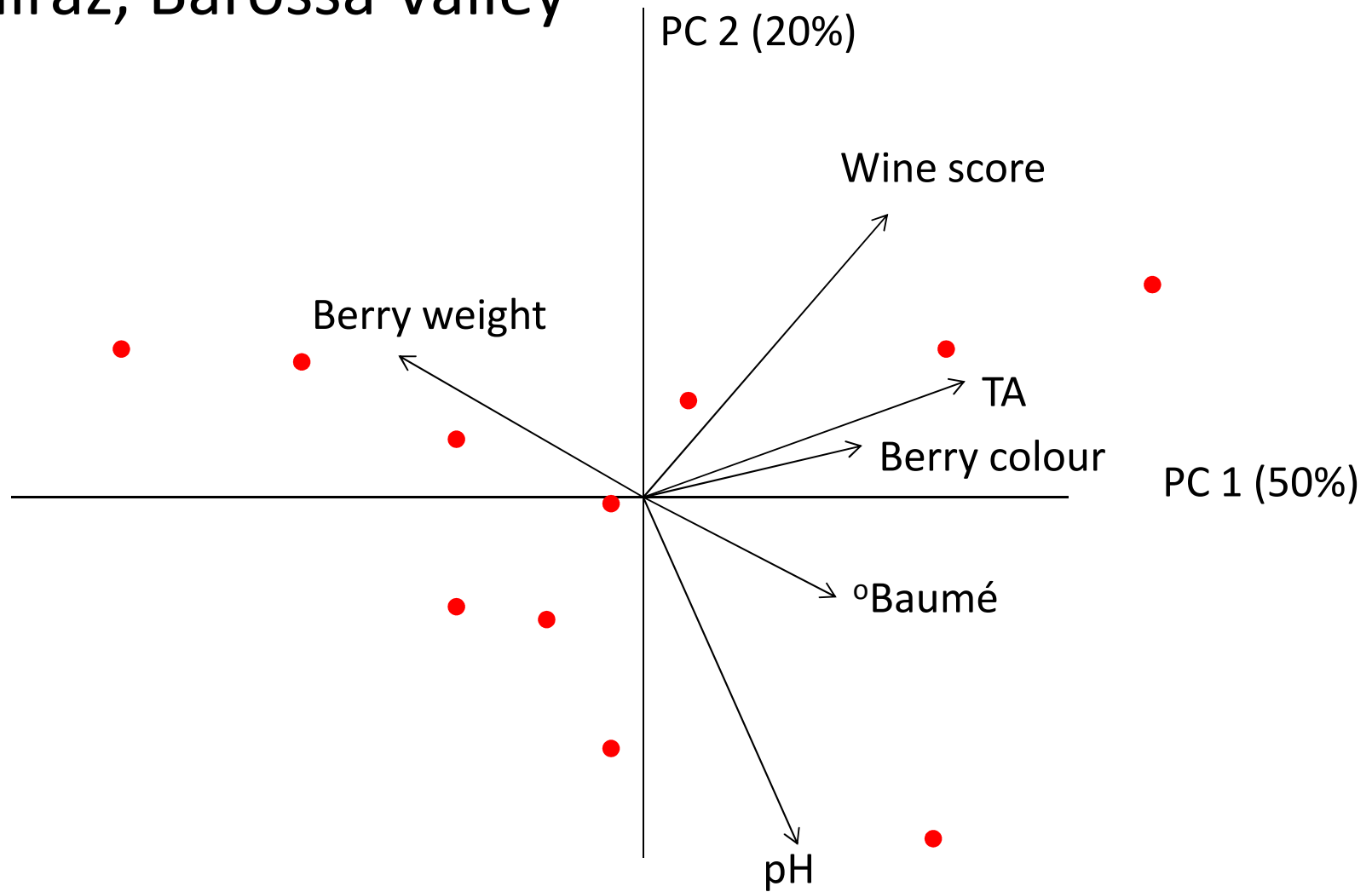
Understanding berry weight relationships with wine quality



Can we go further?

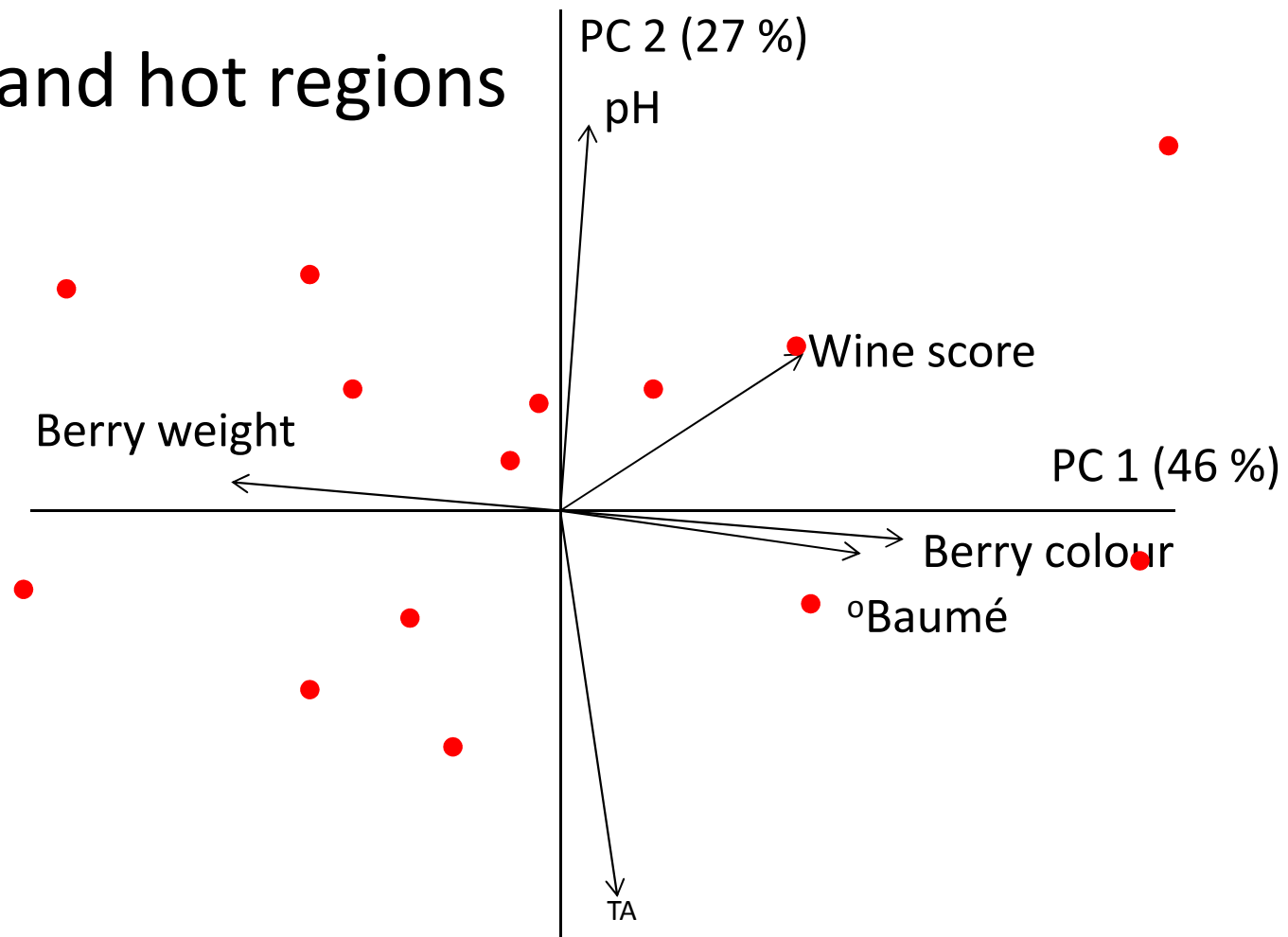
- A combination of measures might be better
- Principal component analysis

Shiraz, Barossa Valley



Shiraz

warm and hot regions



Conclusions

Relationships between berry attributes and wine score/grade should be tested in samples where the range of juice °Baumé is as small as possible.

Berry colour is a pretty good indicator in a certain range of berry colour values

Combination of measures may be best
Not just of chemical and physical measures,
but also of berry sensory attributes and
vine characteristics measures.

the **X**factor

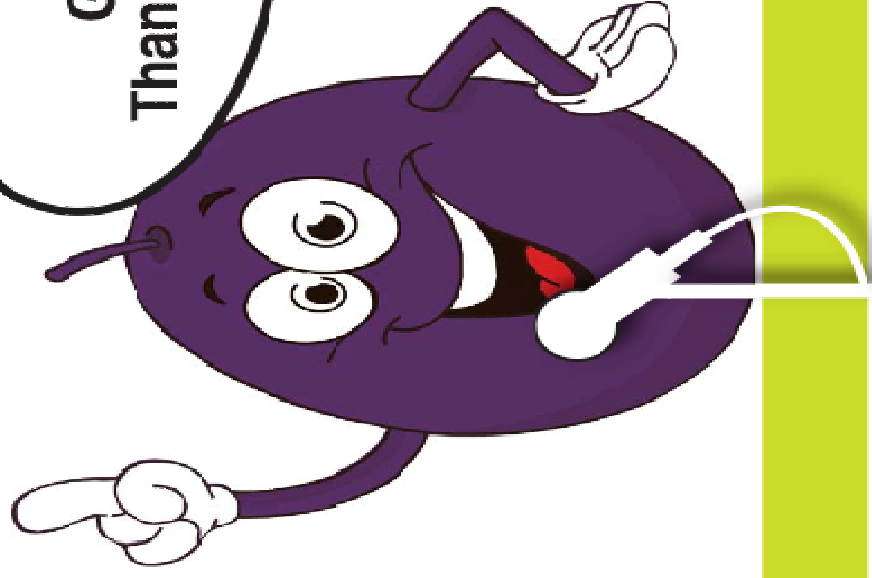
And the
Winner is...

Berry Colour

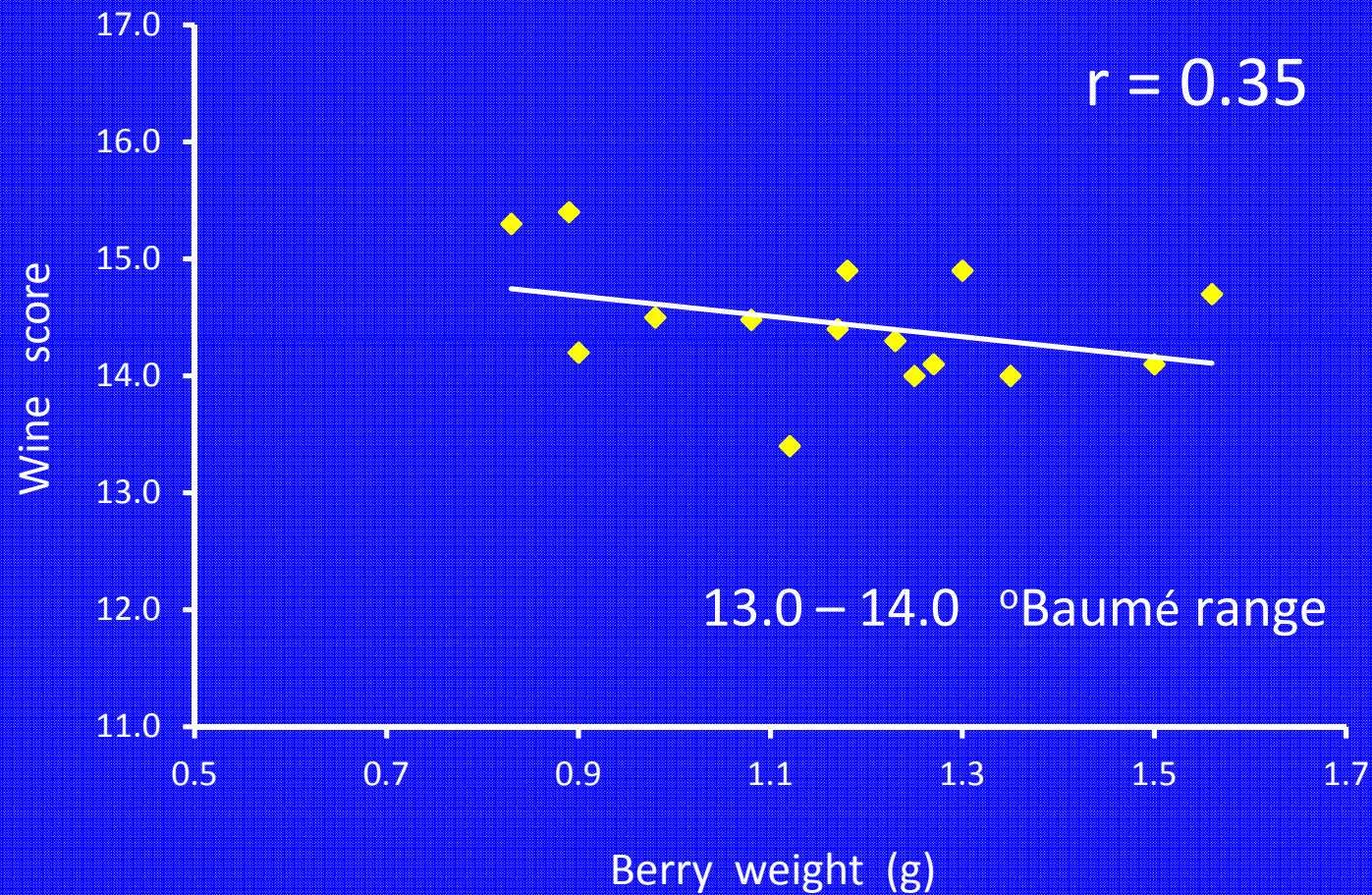


the **X**factor

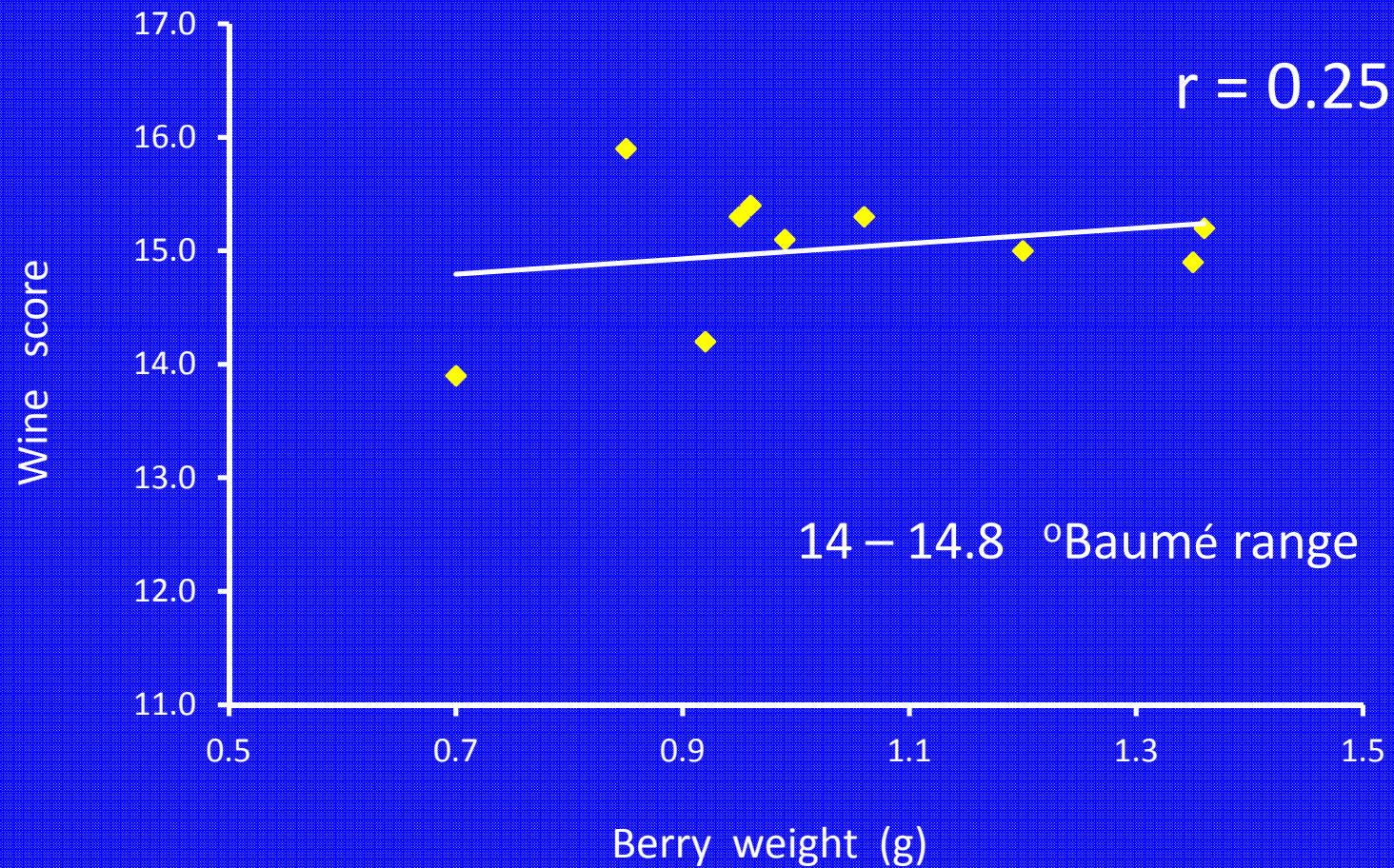
That's my story...
I've had a
Grape time!
Thanks for listening



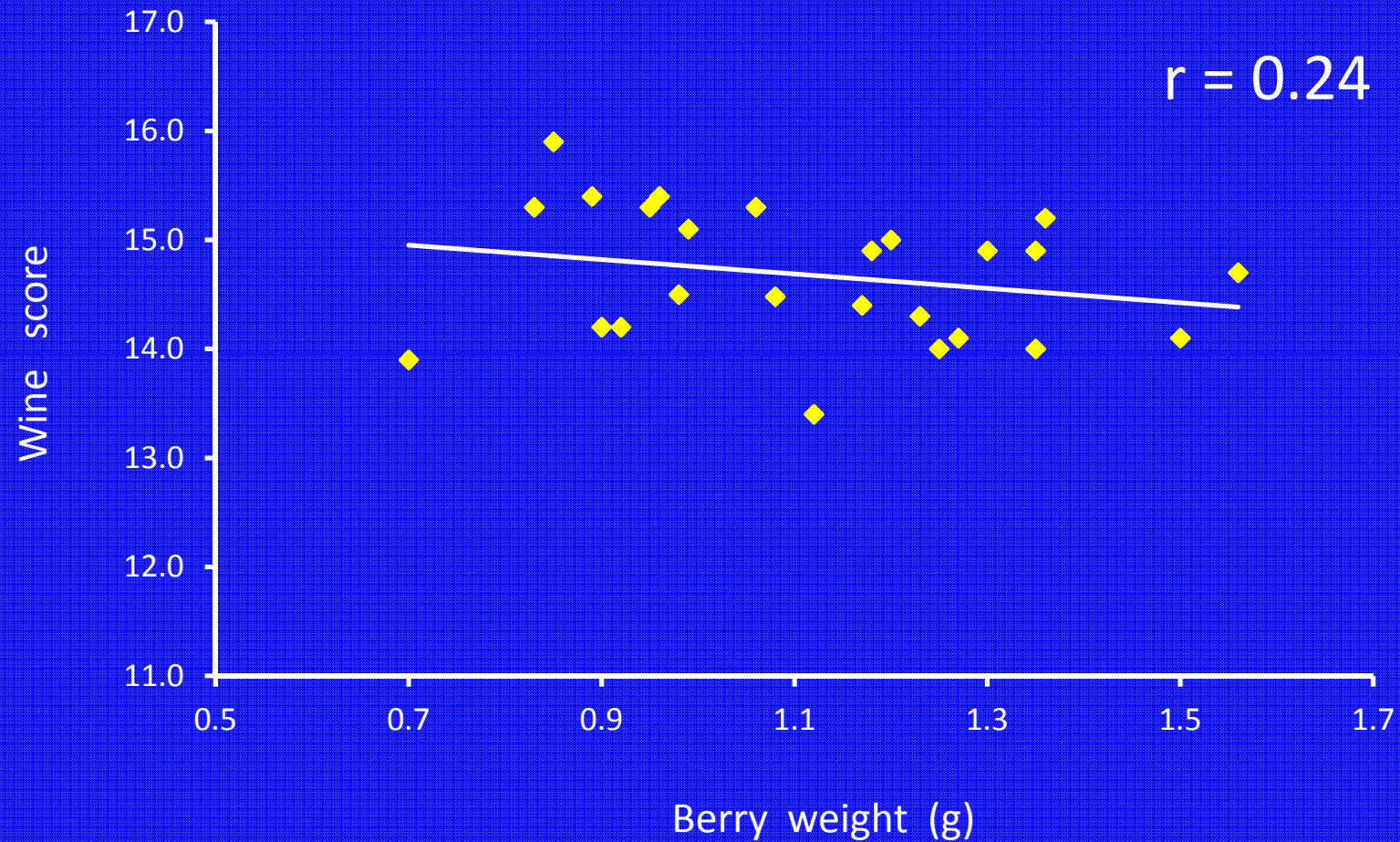
Shiraz, warm and hot regions — Berry weight v Wine score



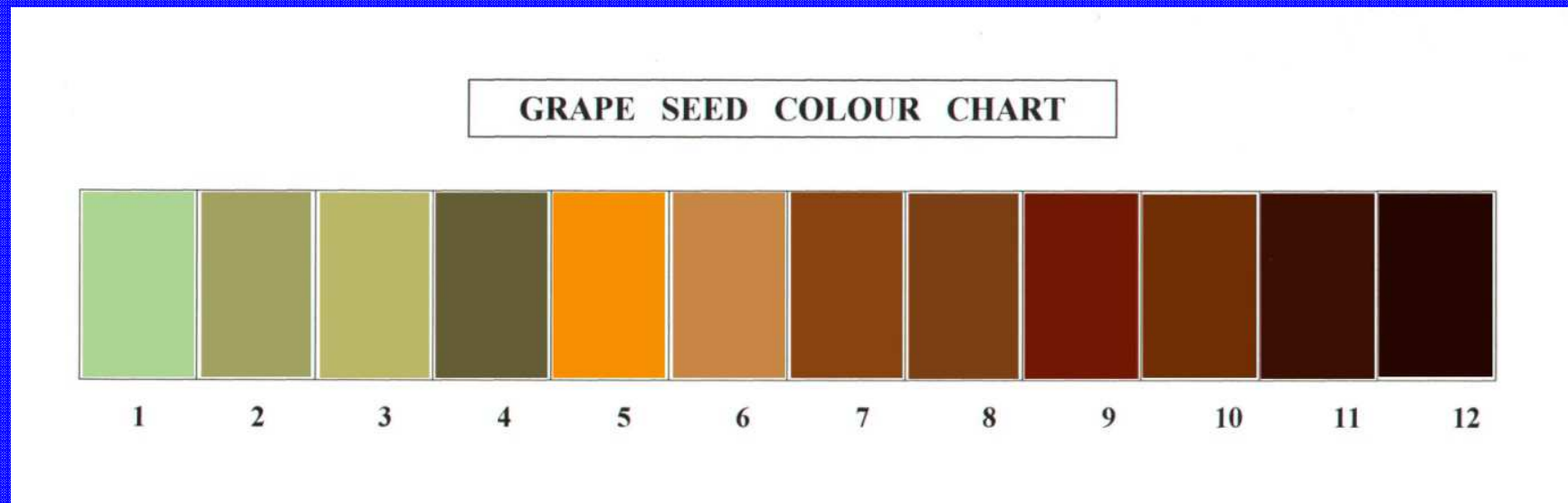
Shiraz, warm and hot regions — Berry weight v Wine score



Shiraz, warm and hot regions — Berry weight v Wine score



Seed colour chart



White grapes - skin colour interior bunches



White grapes - skin colour exterior bunches

