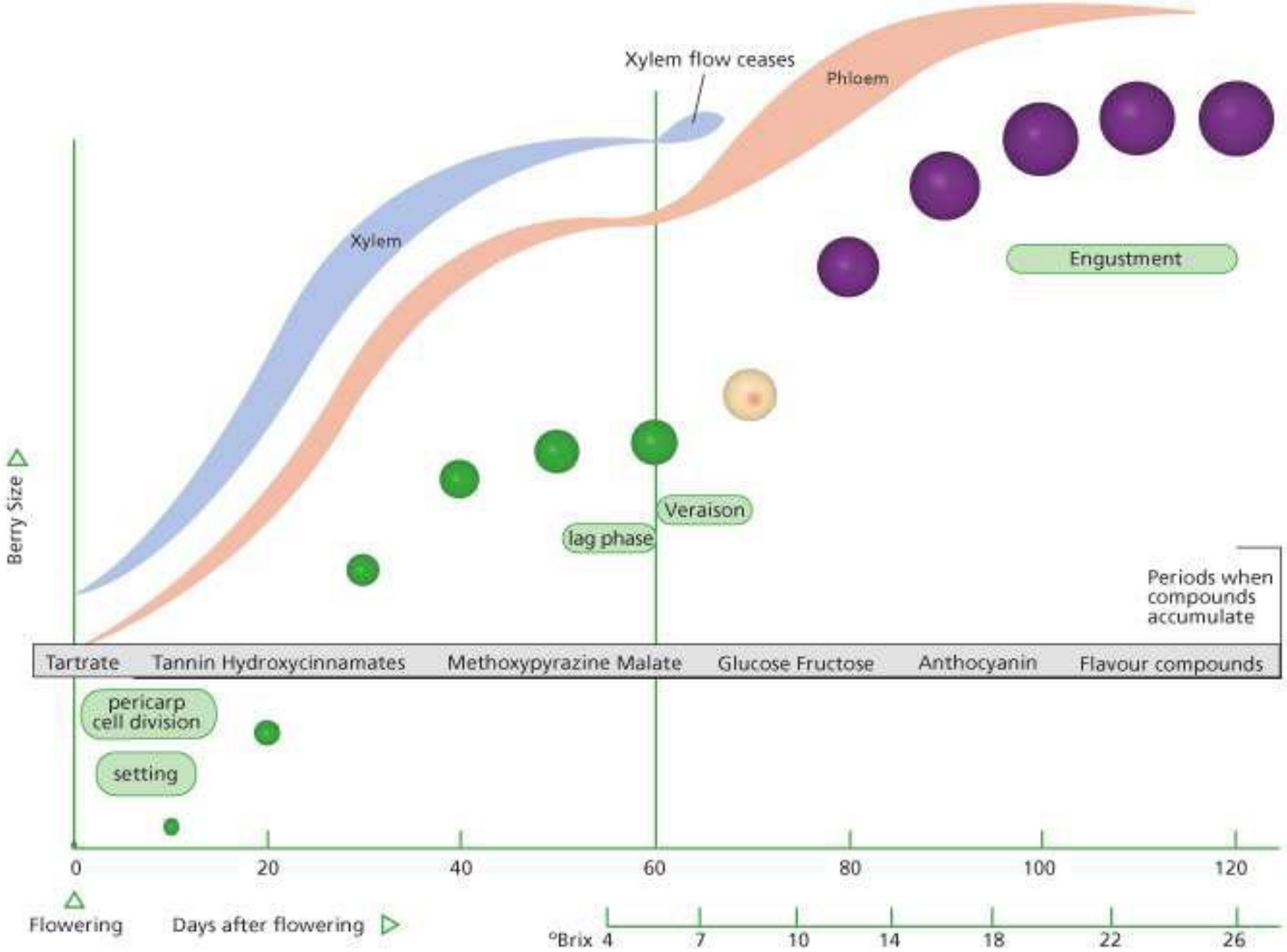

HARVEST
PRE-HARVEST AND
POST HARVEST

Pre-Harvest

- Crop estimate
  - Bunch counts: bunches are counted on a random selection of vines to determine per vine average – may be done somewhat early
    - Bunches per vine x # vines in block = # bunches in block
  - Bunch weights: grape tray or bucket (relative to block size)
    - Grape weight/# of bunches = average bunch weight (in test)
  - Average bunch count x average bunch weight x vine count = crop estimate
    - i.e. 32 bunches x .34 lb x 726 vines/ac x 5 acres = 19.7 tons (39,494 lbs)

Method 2: Lag Phase Method

- Method 2: Lag Phase Method
- This method is based on collecting cluster weights during the “lag phase”. The lag phase corresponds to the time when seeds begin to harden, which is also the period when berry growth slows temporarily. Typically, the lag phase occurs about 55 days after first bloom which corresponds to the accumulation of 1000-1300 growing degree days (GDD) or heat units. GDD of 1200 is the benchmark time for many varieties.
- In general, at the lag phase, berries have reached about 50% of their final weight


Xylem flow ceases
Phloem
Xylem
Engustment
Berry Size
Veraison
lag phase
Periods when compounds accumulate
Tartrate
Tannin Hydroxycinnamates
Methoxypyrazine Malate
Glucose Fructose
Anthocyanin
Flavour compounds
pericarp cell division
setting
0
20
40
60
80
100
120
Flowering
Days after flowering
°Brix 4
7
10
14
18
22
26

Pre-Harvest

- Best to use one method or the other rather than doing nothing. Crop estimation is a “MUST”
- in viticulture regions producing quality grapes and wines. If you have never conducted crop estimation, begin this year. It is never late.
- In general, 70% of the variation in yields comes from year-to-year variation in the number of clusters per vine, and 30% from year-to-year variability in cluster weight.
- Consider a good estimate if it is within 15% of the actual yield. Do not get discouraged if first attempts at crop estimation are inaccurate, because the more experience and data acquired, the more accurate the estimates will become.
- MAINTAIN RECORDS FROM YEAR TO YEAR IN ORDER TO IMPROVE ESTIMATION.

Pre-Harvest

- Line up labor or mechanical harvester
  - Arrange picking and charges with farm management company, labor broker, or direct with pickers
  - If management company: who supplies equipment?
  - If labor broker: does he carry workers compensation?
  - If direct with pickers: negotiate pay (by weight or hourly). Who supplies shears and trays?

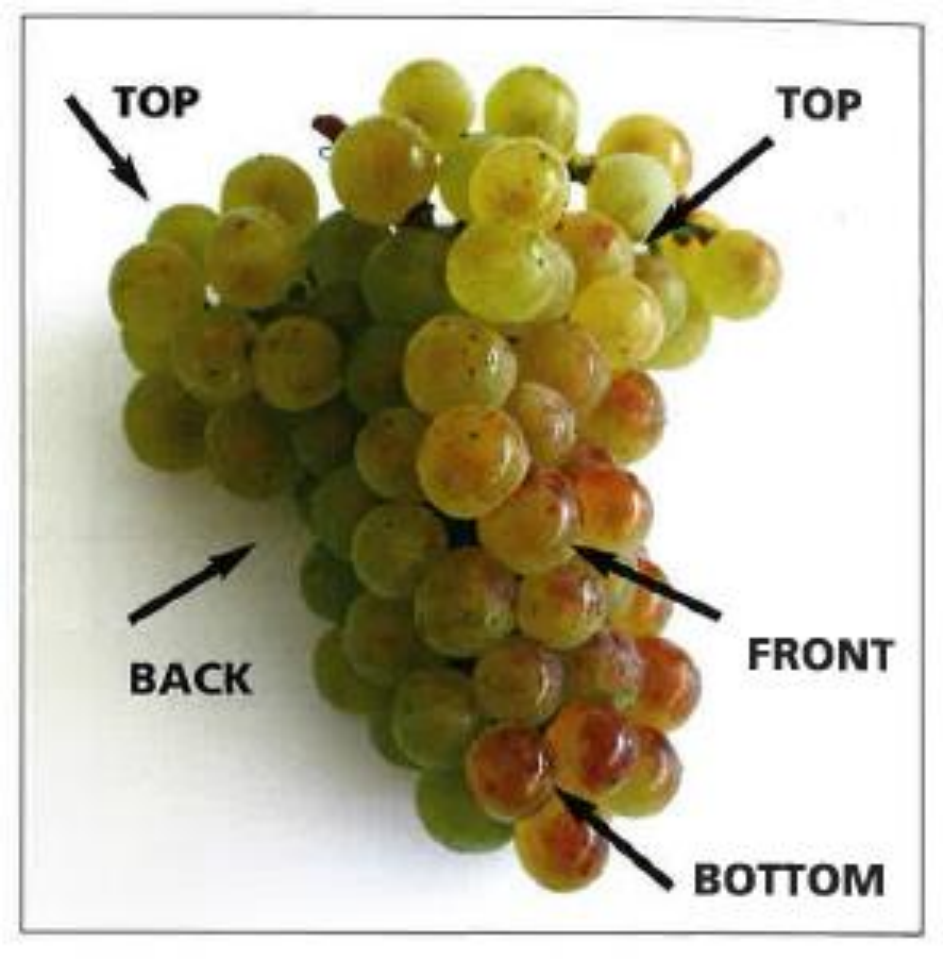
Pre-Harvest

- Prepare equipment: tractors, trucks, trailers, bins, picking scissors, knives, etc.
  - Clean and fresh, food grade paint on gondolas
  - Clean picking bins, trays
  - All equipment in good mechanical order

Pre-Harvest

- Grape sampling – provide accurate estimate of crop chemical standards like Brix, total acid, pH
  - 200 berry samples
  - Good cross section of vineyard block
  - Random samplings from all parts of bunch and vines
  - Tight clusters or raisining may need to take bunch samples
    - Tight clusters may be lower Brix than berry samples indicate
    - Raisined clusters may have higher Brix than berry samples indicate

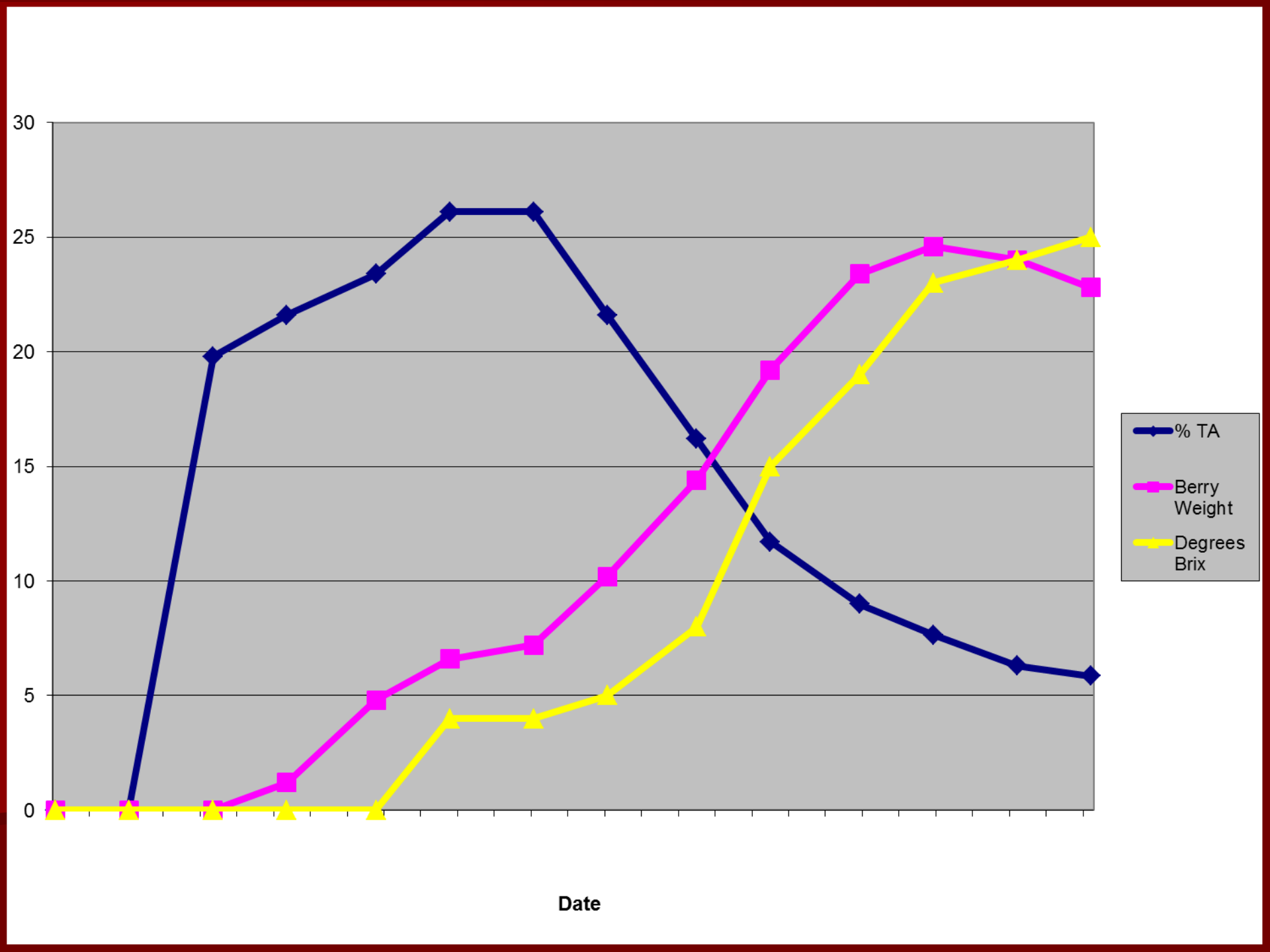
TIGHT BUNCH BERRIES ARE DIFFICULT TO SAMPLE COMPLETELY. BUNCH SAMPLES MAY BE MORE ACCURATE.



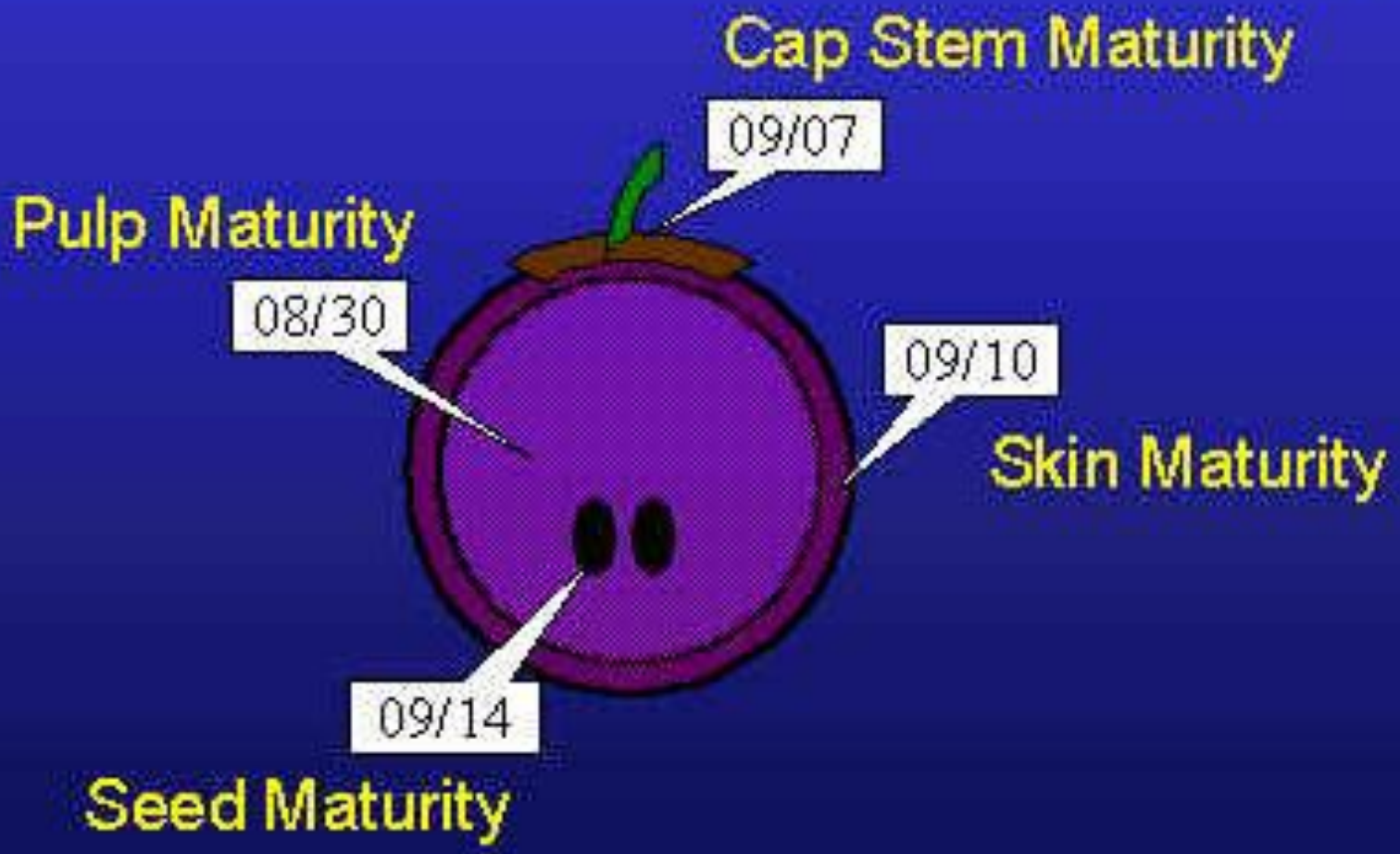
BERRY SAMPLES are not consistent within a cluster.
For berry samples sample from top, back front and bottom
Whole cluster eliminates this need

HARVEST

- Harvest Timing – Brix is still the most significant harvest standard
  - Importance of Brix remains unchallenged, but no longer the sole harvest parameter
  - Brix projects to post fermentation alcohol content at about 60% of the Brix level in modern fermentations


30
25
20
15
10
5
0
% TA
Berry Weight
Degrees Brix
Date

Fruit Maturities



Adapted from Delteil (1998)

ETS Grape and Must Analysis

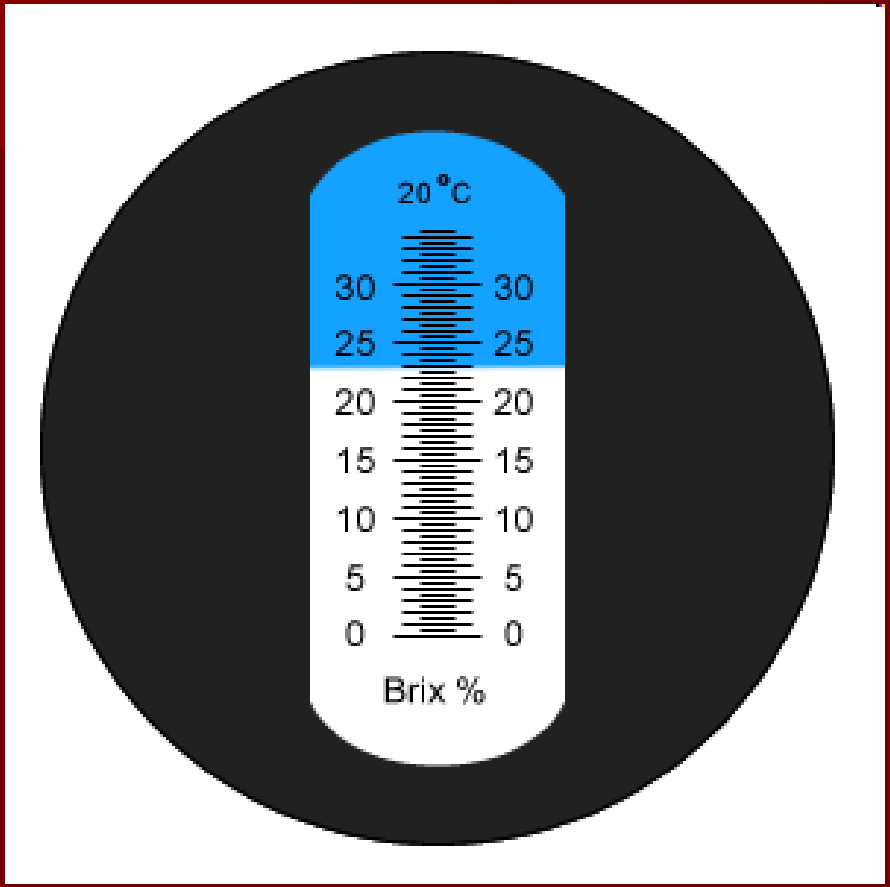
	Common Related Issues: Fermentable Sugar	Ethanol Prediction	Acid Balance	Acid Addition	pH Effects of MLF	Buffering Capacity	Tartaric Acid Stability	Fermentation Inhibition	Sulfide Formation	Ethyl Carbamate	Microbial Stability	Regulatory Issues	Commonly Observed Values: Units	Low	High
Standard Tests															
Brix	X												%w/w	19	30
Fermentable Sugar HPLC	X	X											g/100mL	19	30
pH			X	X	X	X	X				X			2.9	4.2
Titratable Acid (TA)			X	X	X	X	X						g/100mL	0.35	1.20
Tartaric Acid			X	X	X	X	X						g/L	1	11
Malic Acid			X	X	X	X							g/L	0.5	11
Potassium			X	X	X	X	X						mg/L	500	4000
NOPA								X	X	X			mg/L	50	400
Ammonia								X	X	X			mg/L	20	400
Supplemental Tests															
Fluoride								X				X	mg/L	0.1	10
Agrochemical Residues								X				X	mg/L	na	na

Nitrogen by o-phthalaldehyde (NOPA

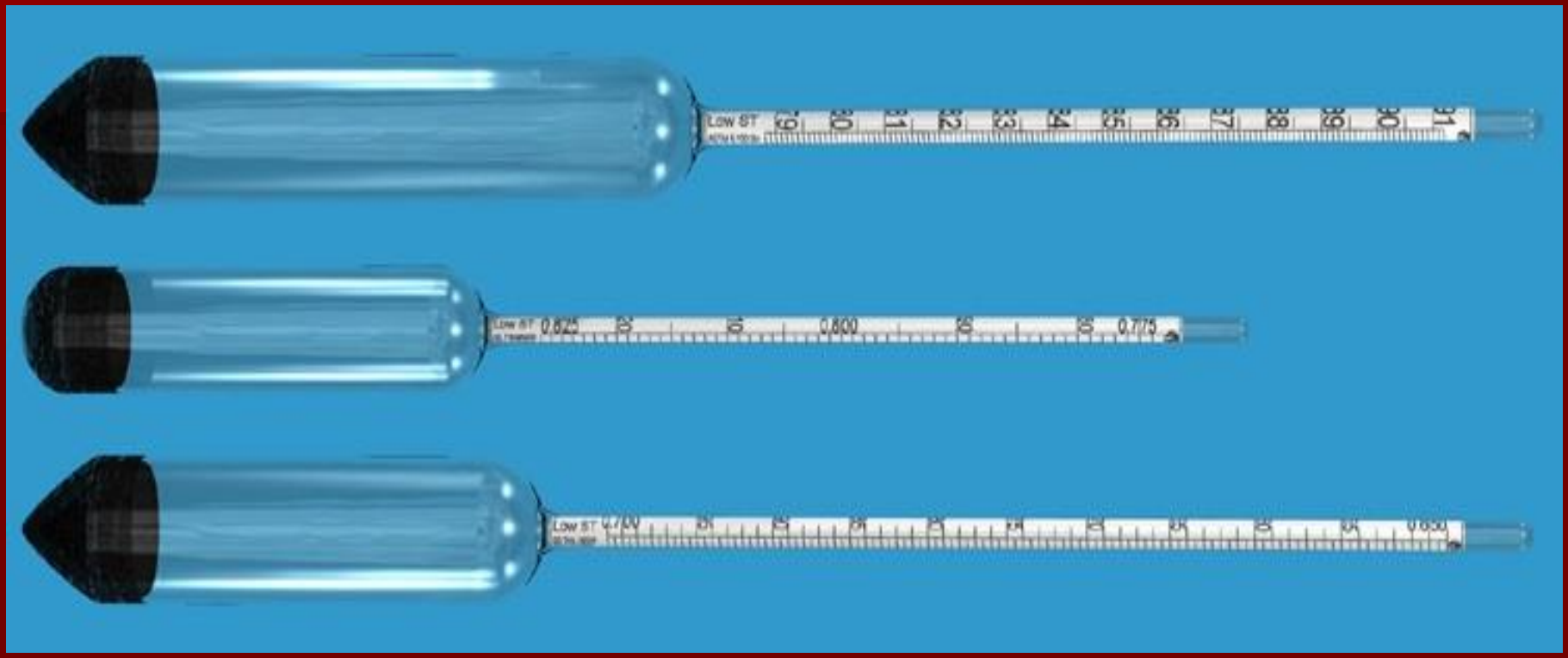
REFRACTOMETER

GRAPE JUICE ON WINDOW

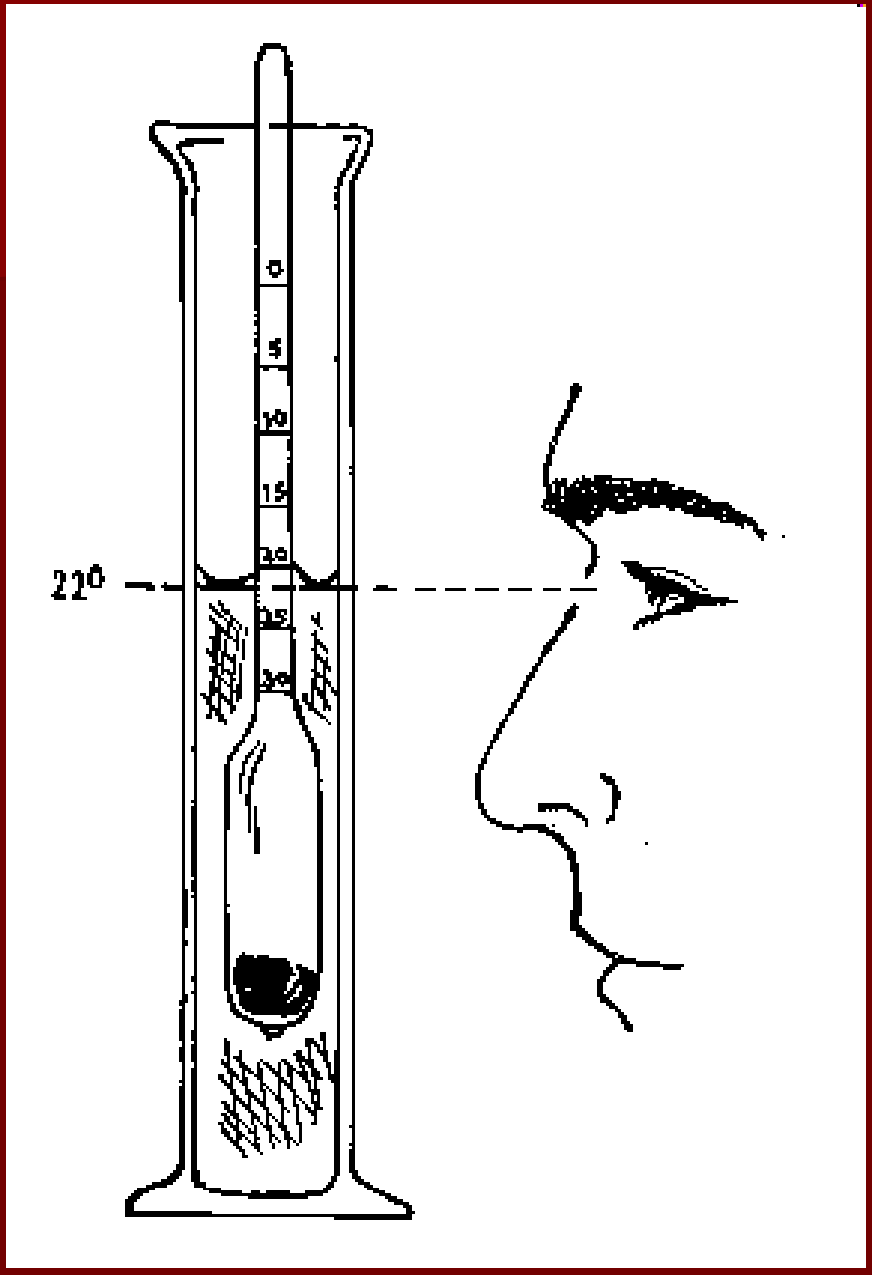
POINT INTO LIGHT SOURCE



23° BRIX

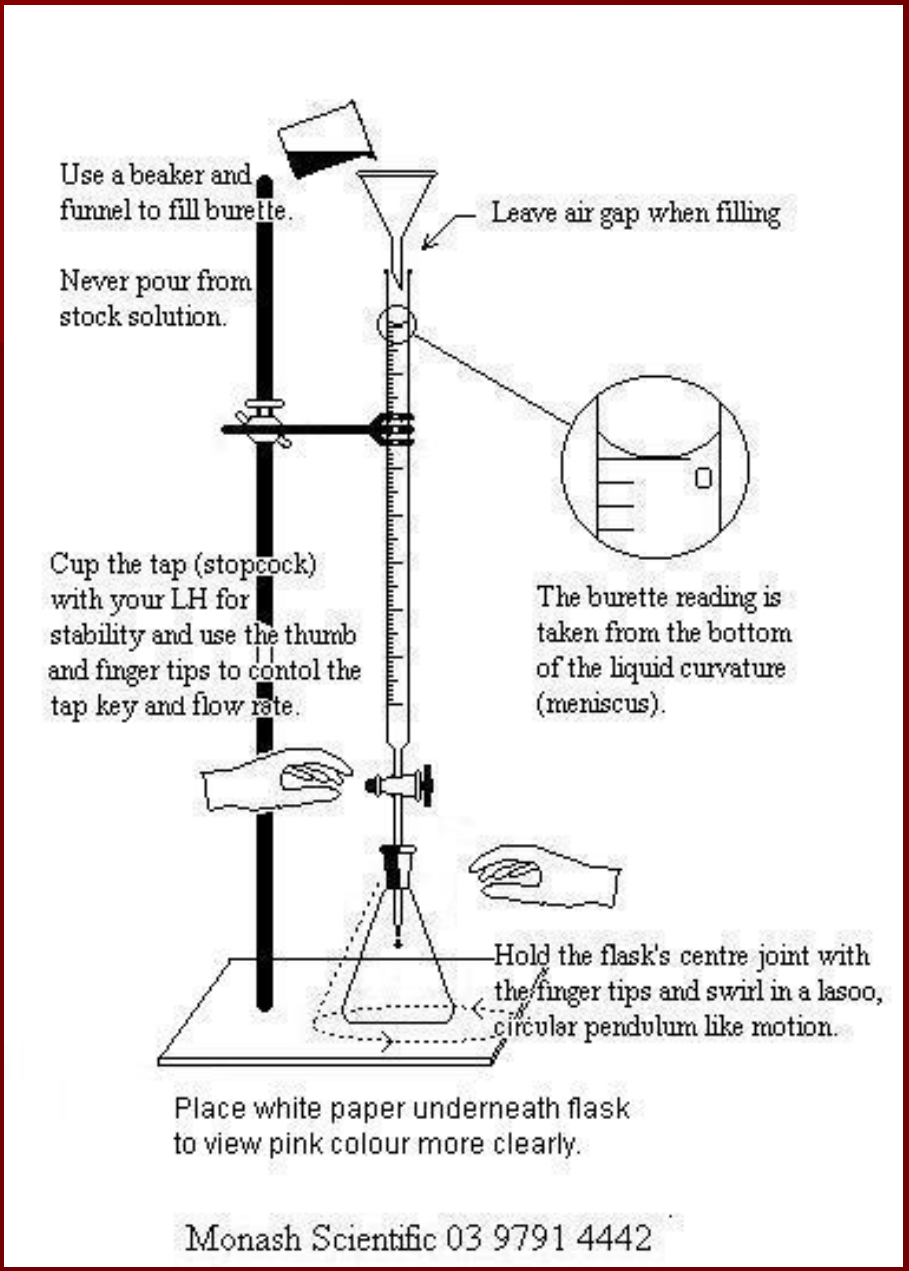


HYDROMETERS


0
5
10
15
20
25
30
21°

pH METER

Used to measure pH (or titration for TA analysis)



Standard titration apperati

HARVEST

- Harvest Timing
  - Growers traditionally prefer to harvest at low end of Brix (sugar) ripeness due to crop weight loss, potential bad weather risk over time
  - Wineries always wanted higher Brix, but now look at flavor ripeness
    - Both have one eye on the grapes and one eye on the weather
  - Modern California harvest Brix parameters (my opinion)
    - Sparkling wines – 18° to 20°
    - Blush wines – 18° to 22°
    - Fruity white wines – 20° to 23.5°
    - Dry white wines and rosés – 22.5° to 24°
    - Red wines - 24° to 26°+
    - Dessert wines - 24° and up, sometimes way up
  - Wineries are looking for other signs of ripeness; growers should at least understand this in viewing their own vineyards

HARVEST

– Modern Harvest Parameters (California)

- Physical and sensory standards

	1	2	3	4
SOFTNESS *Squeeze the berry between the fingers*	> Hard berry > Bursts under strong pressure	> Elastic berry > Changes shape slightly under pressure but goes back to shape quickly	> Plastic berry > Changes shape easily, takes a while to go back to its shape	> Soft berry > Changes shape easily under light pressure, does not readily go back into shape




HARVEST

– Modern Harvest Parameters (California)

- Physical and sensory standards

	1	2	3	4
STALK REMOVAL *Remove berry from stalk (pedicel)*	> Berry strongly attached and/or > Stalk tears the skin, takes much green pulp and some skin out of berry	> Berry comes off with moderate difficulty > Stalk comes off with part of the green pulp	> Berry comes off fairly easily > Stalk and brush includes only a little of uncoloured pulp	> Berry comes off very easily > Stalk and brush with no pulp stuck to them > Brush red in red varieties

Stalks of Chardonnay coming off with some skin (left), with part of the pulp (middle) and with only a little pulp (right).

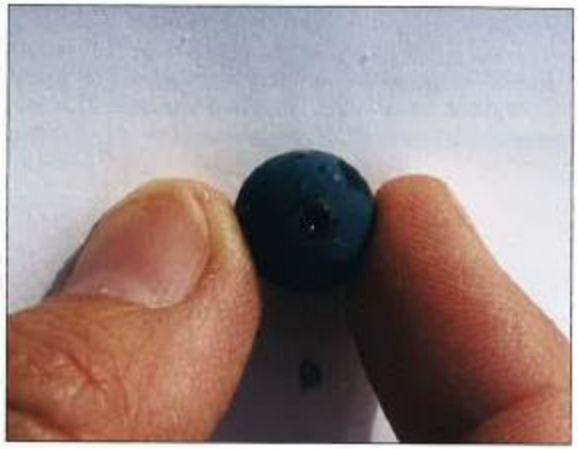
Stalks of Shiraz coming off with part of the pulp (left), a little of uncoloured pulp (middle) and with no pulp and a red brush (right).

HARVEST

- Modern Harvest Parameters (California)
  - Physical and sensory standards

	1	2	3	4
COLOUR RED VARIETY *Look at the stalk end*	> Pink, pale red	> Red, but light penetrates berries	> Dark red, but not evenly coloured around the stalk	> Blackish red, evenly coloured

Pink pale red (score 1) and light red (score 3) berries.

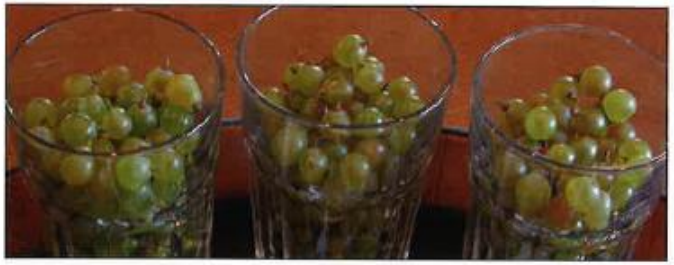


Blackish red, evenly coloured Shiraz berry (score 4)

HARVEST

	1	2	3	4
COLOUR WHITE VARIETY *Observe bulk sample*	> Green	> Green yellow	> Straw yellow	> Amber yellow

Chardonnay of three degrees of ripeness (least ripe on the left).



Chardonnay of 3 degrees of ripeness (least ripe on left) with high variability in colour.

In Chardonnay a high degree of translucency of single berries is a sign of ripeness

HARVEST

	1	2	3	4
Detachment of the pulp from the skin *Crush berries against the roof of the mouth to express juice, later slightly chew skins*	> pulp adheres strongly to the skin and seeds	> a film of pulp adheres to the skin and/or seeds	> film of pulp only slightly visible on skins but juice is released from skins when squashed	> no film of pulp on skin and seeds and no release of juice when squashed
Juiciness of pulp *melting properties of juice in the mouth*	> more than 80% is firm gelatine	> 50% gelatinous, 50% juicy	> almost all juice	> 100% juice

Abnormal characters would be that no pulp film is left on the skin, but the pulp adheres strongly to seeds, or ripe grapes having very gelatinous pulps. Australian pulps may be rather gelatinous, due to water stress or hot periods during the ripening phase.

Shiraz berries and seeds from 3 degrees of sugar ripeness. The left pulp and seed would be scored as 1, the right pulp and seed as 3.

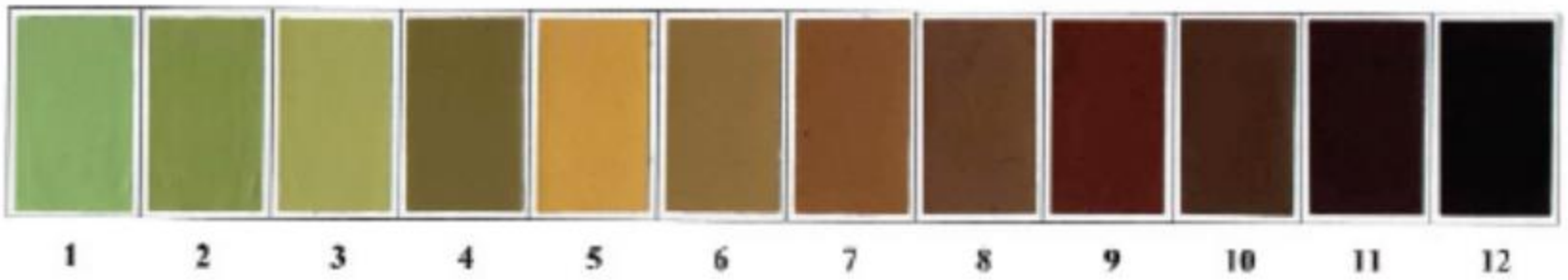
HARVEST

	1	2	3	4
Sweetness *move juice over tongue*	> not very sweet	> moderately sweet	> sweet	> very sweet
Acidity *feeling on the side of the tongue*	> very acidic	> acidic	> moderately acidic	> low acid
Herbaceous aromas *analysis in the mouth*	> intense	> moderate	> weak	> absent
Fruity aromas *analysis in the mouth*	> absent	> weak	> moderate	> intense

Chardonnay at three degrees of sugar ripeness with moderately ripe and rather ripe seeds but gelatinous pulp at all three stages of sugar ripeness.

HARVEST

- Modern Harvest Parameters (California)
  - Physical and sensory standards



Calculating Grape Seed Colour

Take a random sample of at least 20 seeds from a representative sample of berries.

HARVEST

– Modern Harvest Parameters (California)

- Physical and sensory standards

	1	2	3	4
Tannic Intensity *Run the tongue over the palate*	> Tongue slides effortlessly over the roof of the mouth	> Tongue sticks slightly to the roof of the mouth	> Tongue slides over roof of the mouth with difficulty	> Tongue slides over roof of the mouth with great difficulty

Examining skin tannic astringency

	1	2	3	4
Grain size and Astringency of tannins *Spit the skins out, assess astringency and time needed to re-salivate*	> Grippy, rough, aggressive > Difficult to re–salivate after more than 5 seconds	> Coarse size grains > Difficult to re-salivate for a few seconds	> Medium size grains > A little difficult to re-salivate	> Soft, fine and silky grains > Not difficult to re-salivate

HARVEST

- Modern machine harvesters: fast, efficient, deliver clean fruit, free of "material other than grapes" (MOG)
  - Can pick 24 hours – night picking
  - Additional attachments de-stem grapes in vineyard
  - Can outwork a large crew
  - Much improved, but can cause some damage
  - Limited to certain trellis systems
  - Grapes cannot be shipped long distance/time
  - Harvester breaks down, better get another or a picking crew


BRAUD
BRAUD
25


SB 64


ROCK

HARVEST

- Hand harvest
  - Traditional social values
  - Night harvest more difficult, unusual
  - Labor negotiations – immigration status
  - Physical limits unless large crew availability
  - Well trained and managed or crew will pick everything
    - High MOG, bunch rot, mildewed grapes are possible
    - Pay well and get good picking
    - On-site management important
  - Crew can't break down
  - Grapes can be shipped long distance/time

CLOSE SUPERVISION OF PICKING CREWS IS A MUST

HARVEST

- Picking standards
  - Grapes picked before heat of day
  - No MOG (or to contract standards)
    - Includes leaves, canes, rocks, tools
  - No bunch rot, no mildewed grapes
  - No second crop grapes
  - Prompt delivery


12
TARE 466


SHIPPING
&
RECEIVING

PRE-DESTEMMER

MANUAL HARVEST

POST AUTOMATED

WASTE

SORTING SYSTEM

CLEAN PRODUCT

HARVEST

- Record keeping
  - Grapes delivered with Harvest Slip showing bin/gondola number, picking crew, date and time finished picking, crew foreman signature
  - Winery issues weight slip with above info and weight or winery completes harvest slip with grape weight
  - Winery scales and Weighmaster must be certified
  - Winery should be licensed to buy grapes (CDFA)
  - Clear record if CDFA hearing is ever needed

POST HARVEST

- There are still “useable” degree days after harvest
  - Need to maintain vine photosynthesis
  - Fully hydrate vines and then slowly taper off
    - Vines have lower need minus fruit and active growth
    - Daily degree day accumulation diminishes and so does irrigation
    - Irrigation stops well before first frost as vines move to dormancy