

Viticulture - Characteristics of the vine - Clones

DEFINITIONS

- True meaning being an identical copy.
- The selection of a particular vine that has characteristics that set it apart from the majority.
- Clones are different from the general population but are identical to each other within the clonal group.
- A single vine or population of vines all derived by vegetative propagation from cuttings or buds from a single mother vine by deliberate clonal selection.

SELECTION

- It is possible to select clones specially bred for higher quality, disease resistance, higher yield, deeper color smaller berries, etc.
- Some clones can come about through spontaneous bud mutations, which then result in genetically altered shoots.
 - Almost always they are deleterious (damaged).
 - When positive, cuttings can be taken from affected shoot resulting in a new clone.
- Mutation is spectacular enough to the human eye for them to be selected.
- For a producer, the color or size of the bunch may be important.
- For a biochemist, a mutation in a synthetic pathway can be important, which is hidden from human eye.
- Disadvantages in clonal selection:
 - If all vines in the same area are closely related, the spread of disease is easy.
 - Some clones are very specialized and only suitable for certain regions and styles of wine.
 - Clonal selection has led to an increase in yield leading to overproduction.
 - Led to a reduction in vine genetic resources. To counter, collectors of old varieties have been collected both in the field and in vitro.
- Some clones are so outstanding that they become internationally distributed.
 - Clones of Riesling from Geisenheim, Germany.
 - 1990s considerable interest in Burgundian (Dijon) clones.
- Clones or Field Selections?
 - ENTAV/INRA clones with certification number were propagated from the same parent mother vine.
 - In California, clones is also used to describe a diverse array of plant materials propagated and grown for decades. i.e. Rved clone of Chardonnay, Bella Oaks clone of Cabernet Sauvignon
 - Field selections are a broad range of genetic material passed down generations. Often mis-named as clones.
 - When plants have been established for an extended period in one location, the original source is forgotten and the present vineyard becomes the new 'clonal' source.

RULES AND REGULATIONS

- Normally government agencies are involved in selection, evaluation, and distribution to nurserymen, and often the availability of clones and their acceptance varies regionally.
- Germany
 - There is a formal process of clonal evaluation and a systematic numbering system.
- France
 - After each clone has passed through a period of sanity and genetic selection it undergoes registration and is assigned a unique certification number by ONIVINS (Office National Interprofessionnel des Vins France) after approval by the CTPS (Committee of Selection of Cultivated Plants of the French Ministry of Agriculture).
- Between France & US
 - A large number of clones developed by ENTAV & INRA are available throughout the US.
 - French authorities have attempted to control movement of their materials by the establishment of propagation licenses with a limited number of California nurseries
 - French authorities value efforts invested in their development.
 - There is competition from the same genetic material imported from non-French government approved sources.
 - Some non-approved clones are certified by CDFA (California Department of Food & Agriculture).

PROPAGATION

- **See revision notes under Vine propagation.**
- When a vine has been selected, it is propagated by taking cuttings.
- Vine propagation occurs vegetatively.
- Cuttings taken from vines are used to produce new plants, which are genetic clones of the parent variety.
- Attempts to grow vines from seeds are doomed to failure as the genetic reassortment that takes place usually means the loss of positive features of the variety.
- Vine nurseries may sell a range of clones of each variety each with different attributes and characteristics, and individually identified by numbers and/or names.

NURSERY PERSPECTIVES

- Herrick Grapevines, St. Helena, one of four licensed nurseries to sell ENTAV INRA plant material.
- More than 80 clones imported (as of 2003), 20 still in quarantine.
- Most popular according to Bob Herrick (2003):
 - Cabernet Sauvignon 337, 191, 341
 - Pinot Noir 777, 667, 459, 115
 - Syrah 470, 174, 383, 525
 - Merlot 181, 343, 346, 182
 - Chardonnay 548, 809, 95, 96
 - Cabernet Franc 214, 332, 327
 - Cot 595
 - Petit Verdot 400
 - Sauvignon Blanc 317, 376
- 30-cent per vine royalty to ENTAV INRA on each sale of a vine.

VIRUSES

- In ENTAV / INRA clones:
- 2000-2001 a number of these clones contained with Grapevine Leafroll virus type 2 in California.
- Affected: Cabernet Sauvignon 191, 337, 341. Sauvignon Blanc 317.
- Cabernet planted on 3309C rootstock tends to be more susceptible to virus contaminants than others, vineyard dependent.

CALIFORNIA HISTORY

- Clones used to jump start the wine industry after Prohibition.
- UC Davis and professor Harold Olmo provided clean, virus-free, high yielding stock (Chardonnay FPMS clone 04).
- Prior, vines were poor yielding of poor quality because of the contamination of viruses.
- During the period of expansion (to the late 1980s) many California's field selections were created often by UC Davis' clones.
- Rapid phase of replanting from AxR#1 rootstock susceptibility to phylloxera and demand to make higher quality wines.
- Pioneering vitners understood quality came from French clones closely planted.
- David Adelsheim of Adelsheim Vineyards and Raymond Bernard from University of Dijon in later 1970s to 1980s imported cuttings from Burgundy vineyards, known as Dijon clones, and was introduced into Oregon State University clonal importation program (now defunct). This material was shared with FPMS (Foundation Plant Material Service, UC Davis) and released as CDFA registered nursery stock.
- These efforts made some of the highest quality Burgundy clones available:
 - Pinot Noir 113, 114, 115, 667, 777
 - Chardonnay 76, 95, 96
- 1989 Austin Goheen, UC Davis, brought clones from Ministry of Agriculture in France previously non-ENTAV approved.
- 1993 John Caldwell, Caldwell Nursery, brought back 'Base A' (high quality mother stock) material from 2 nurseries.

CHARDONNAY

- 34 official French clones, ENTAV / INRA, 34 as of 2006 but some have come obsolete.
- Most of the clones were developed at the University of Burgundy in Dijon.
- They have been classified as Dijon/Burgundy type or Chardonnay type (more vigorous, higher yielding, higher acidity).
- Dijon/Burgundy clones:
 - 75, 76, 78, 95, 96, 116, 117, 118, 119, 277, 548, 809

- Champagne clones:
 - 118, 121, 124, 125, 130, 131, 132
- Other clones:
 - 122, 128, 414, 415, 549, 1066, 1067, 1068
- 77 & 809 - Grapey perfume, quite widely planted, can add a rather incongruously aromatic note to blends.
- 77 has a muscat flavour.
- 809 has a high concentration of linalool, and having aromatic grapey aromas.
- 548 has the highest quality.
- 95 has a slightly higher yield than 548.

Burgundy type > ----- > Champagne type

small berries lower yields Gm 50 Gm 51 Gm 52 Gm 53 Gm 54 Gm 57 D 276 aroma D 258 aroma Fr 155 intensive aroma ENTAV 76 ENTAV 116 ENTAV 117 ENTAV 118 ENTAV 119	medium berries medium yields Fr 150 Fr 151 D 278 D 263 D 264 D 269 D 274 D 261 D 259 D 253 ENTAV 95 ENTAV 96 ENTAV 277 ENTAV 548	large berries high yields Gm 1 Gm 2 Gm 3 SMA 108 SMA 123 SMA 130 St 130 Fr 152 D 271 D 250 D 260
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Clone	76	78	95	96	277
Origin	Saone-et-Loire	Cote d'Or	Cote d'Or	Cote d'Or	Cote d'Or
Fertility	Medium	Medium to Superior	Medium	Medium	Superior
Bunch Weight	Medium	Medium	Medium	Medium	Medium
Yield potential	Fairly high to high	High to very high	Fairly high to high	Fairly high to high	High to very high
Suger content	Superior	Inferior	Superior	Medium	Medium
Wine character	Well-balanced. Fine wines typical of variety. Non-aromatic (very low concentrations of linalool & geraniol)	If over produced, wines are thin and neutral.	Full, rich, and balanced wines with fine aromas.	Nervous, balanced wines and aromatic wines.	Balanced and aromatic.
Observations	Good quality. Regular production.	Very productive. More regular than 75. Vigor and yield has to be controlled or wine is neutral or common.	Very good in any situation.	Regular. Good production.	Vigour and yield has to be controlled or the wine is neutral or common.

Fertility - the number of bunches in relation to the number of buds left after pruning.

Pinot Noir	114	115	459	667	743	828	943
Fertility	Medium	Low to medium	Medium to high	Low to medium	High	Medium	Medium
Cluster weight	Low to medium	Low to medium	High	Low to medium	High	Low	Low
Berry size	Medium	Medium	Medium to high	Medium		Low to medium	Low to medium
Yield	Low to medium	Low to medium	High	Low to medium	High	Low	Low to medium
Sugar content	Medium to high	Medium to high	Medium	Medium to high	Medium	High	High
Acidity	Medium	Low to medium	Medium	Medium		Medium	Low to medium
Color	Medium to high	Medium	Medium	Medium		Medium to high	Medium to high
Tannins	Medium	Medium to high	Medium to high	Medium		Medium to high	Medium to high
Oenology potential	Aromatic wines with enough tannins.	Complex wines with good tannins.	Wines with good balance and texture.	Wines with good aromas and tannins.	Suited for sparkling wines.	Wines with good aromas, balance and tannins.	Wine with good color and concentration.
Comments	Irregular clone but with good blending potential. FPS 46 + 47 same clone.	Regular production, good agronomic characteristics and good quality wines. Good aging potential. FPS 73 + 89.	Yields have to be limited to achieve good quality. FPS 38.	Good agronomic characteristics and good quality wines. Good aging potential. FPS 72 + 93.	FPS 79.	Carries Leafroll 2 virus. Appreciated because of agronomic character, the quality and color of wines. Good aging potential. California has "suitcase" version w/ different characteristics and higher yield.	Shoots are not straight up. Should be used with caution because its behavior in different years.