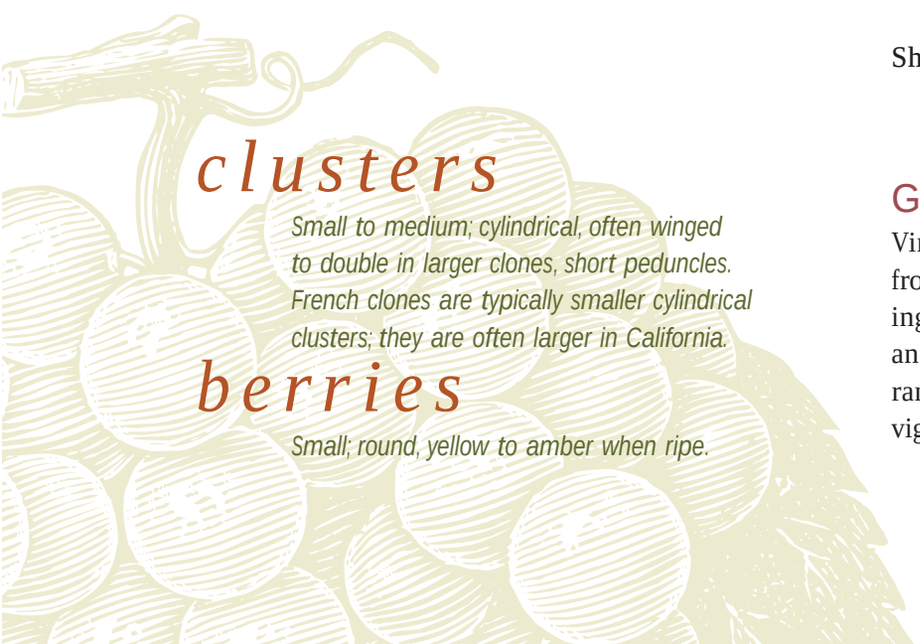
Chardonnay

Synonyms

Chardonnay has been referred to as Pinot Chardonnay in California. The variety has often been confused or associated with Pinot blanc and Melon in many wine regions of the world. However, the three varieties are distinct from each other and can be separated by morphological differences and more recently by genetic comparative testing. Recent genetic studies indicate that Chardonnay is a cross between Pinot noir and Gouais blanc.

Source

Chardonnay is one of the leading white grape varieties in the world for production of high-quality white wines. The variety probably originated from the Burgundy region of France. The name "Chardonnay" has been linked to a village in the Mâcon region and is derived from Cardonnacum, which means "a place of chardons or thistles." In California there are references to Chardonnay being grown in the late 1800s. Plantings remained limited due to Chardonnay's low fruit yields compared to the higher-yielding varieties grown at that time. During Prohibition most Chardonnay vineyards were uprooted in favor of varieties that could withstand shipment to the East Coast. After Prohibition two surviving Chardonnay vineyards were the Wente Vineyard in Livermore and Paul Masson's La Cresta Vineyard in the Santa Cruz Mountains. These vineyards are believed to represent different introductions of Chardonnay into California. Budwood collected from the Wente Vineyard has been a major source for the expansion of Chardonnay acreage in the state. In 1960 it was estimated that only 150 acres of Chardonnay existed in California. By 2000 there were 103,491 acres reported, making it the state's most widely planted wine grape variety.



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Small to medium; cylindrical, often winged to double in larger clones, short peduncles. French clones are typically smaller cylindrical clusters; they are often larger in California.

berries

Small; round, yellow to amber when ripe.

Description

Clusters: small to medium; cylindrical, often winged to double in larger clones, short peduncles. French clones are typically smaller cylindrical clusters; they are often larger in California.

Berries: small; round, yellow to amber when ripe.

Leaves: medium; more or less entire with shallow lateral sinuses; U-shaped petiolar sinus with naked veins; short, broad teeth; upper surface bullate and rough; lower surface mostly glabrous with scattered hairs.

Shoot tips: downy white; young leaves yellow-green with subtle bronze-red tinges.

Growth and Soil Adaptability

Vine vegetative growth can vary significantly from weak to moderately vigorous depending on climatic region, soil, virus status, and rootstock selection. Adaptable to a wide range of soil types, Chardonnay's highest vigor will be on deep valley bottom soils

with high moisture availability. Growth on low-vigor sites can be influenced by rootstock selection. Using higher-vigor rootstocks can improve vine growth during vineyard establishment. In the cooler coastal areas, persistent winds can significantly reduce the growth and yield capacity of Chardonnay vines. Shoots in non-positioned canopies will display a trailing growth habit, especially when vines have high vigor. Planting density will depend on potential vine vigor, spacing, and trellis design. Vine in-row spacing can vary from 4 to 6 feet apart.

Rootstocks

Chardonnay has no known incompatibilities when FPS-certified budwood is used to propagate planting stock. Field selections that are infected with viruses can cause graft incompatibilities. Chardonnay has been grown successfully on a wide variety of rootstocks. Rootstock selection should be based on the pest situation, soil characteristics, and potential vine vigor of the site. In low-vigor sites the use of higher-vigor rootstock varieties can reduce the time needed to train vines. When nematodes are present, the selection is more limited due to the lack of nematode tolerance of many of the rootstocks. In the Central Coast, rootstocks have been observed to influence the severity of winter injury on 1- to 3-year-old Chardonnay vines in areas where temperatures during the winter commonly fall well below 32°F. The rootstocks 110R and 3309C appear to have more severe symptoms than other selections.

leaves

Medium; more or less entire with shallow lateral sinuses; U-shaped petiolar sinus with naked veins; short, broad teeth; upper surface bullate and rough; lower surface mostly glabrous with scattered hairs.

Clones

In the early 1950s, Louis P. Martini made selections from the Stony Hill Vineyard in the Napa Valley, which had been planted as a mass selection of budwood from the Wente Vineyard. An early University of California clonal selection effort in the late 1950s by H.P. Olmo identified more productive clones. These early clonal studies demonstrated the possible yield improvement for a variety that had had limited interest due to low-yielding selections. Chardonnay FPS selections 04 to 14 were eventually released from the Martini material. FPS selections 04 and 05 are the most widely planted in California. Some confusion remains over the term "Wente clone." The name has described both an older selection with small clusters that have a high percent of shot berries (often called "old Wente") and the more productive heat-treated selections from FPS that can be traced back to the Wente Vineyard.

A number of field selections have also been propagated from older vineyards with a history of high wine quality. Budwood from the Mount Eden Vineyard in the Santa Cruz Mountains, which was planted from budwood from Paul Masson's La Cresta Vineyard, most likely represents a separate introduction into California. It is a low-yielding, virus-infected selection with small berries and tight clusters. There are also Chardonnay musqué selections such as Rued, See's, Spring Mountain, and Sterling (FPS 79 and 80) that have a slight muscat-like character.

Nearly one hundred clones and subclones of Chardonnay are now available in California. This is due to the aggressive addition of California heritage selections of Chardonnay to the registered Foundation Vineyard collection (including those mentioned above), combined with importation from Italy and especially, France. Available in the ENTAV-INRA® trademark program are clones 76, 95, 96 124, 131, 277, 548, and 809. Just a sample of the generic certified selections includes Chardonnay FPS 37 (French 95), FPS 39 (French 78), FPS 40 (French 125), FPS 41 (French 352), FPS 42 (French 277), FPS 69 (French 76), FPS 70 (French 96), and FPS 81 (French 117).

Recent clonal evaluations among Chardonnay selections have shown differences in yield, vigor, fruit intensity, and flavor profiles. There is no one best selection; the most complexity may be achieved by blending wines made from several selections. Wines produced from a single clone can vary greatly due to climatic region and site conditions.

Production

Vine yield can vary considerably by climatic region, clonal variation, and cultural practices. Crop size can range from 2 to 8 tons per acre. The variety was originally grown mainly in the coastal production areas; significant acreage now exists in the warmer interior valleys.

Harvest

Period: An early season variety, in warmer regions ripening in late August to early September; and in colder production areas ripening mid- to late October.

Method: Short peduncles and many small bunches slow hand harvest, but cluster stems are thin and easy to cut with knives or shears. Harvest is easy to moderately easy with horizontal-rod or bow striker machines. Fruit comes off mostly as single berries with moderate juicing. Bow rods picking well-trained vines on vertical-shoot-positioned trellises have lower shoot and spur breakage than straight-rod heads. Shoot breakage can be high due to the brittleness of the wood, especially with dense foliage. Harvestability is medium with trunk shakers. Fruit comes off as single berries with medium juicing. Adding straight rods to the picking head can improve crop removal in some vineyards.

Training and Pruning

Vines are commonly trained to bilateral cordons and spur pruned. On low-vigor sites, higher plant densities and the use of unilateral cordons may produce vines that better balance fruit and vegetative growth. Quadrilateral cordon training should be used only on high-vigor sites. The number of spurs left per vine will depend on in-row vine spacing, bud fruitfulness, and vines' capacity for yield. For selections with small clusters or when bud fruitfulness is low, the use of head training or short cordons with cane pruning may improve vine yields. Chardonnay is adaptable to mechanical pruning systems. In cooler production areas, crop levels need to be managed to avoid overcropping, which can result in delay of fruit ripening and potential loss in shoot vigor.

Trellising and Canopy Management

For low- to moderate-vigor sites, vertical-shoot-positioned systems are appropriate. For higher-vigor sites, horizontal or vertical splitting of the canopy can improve canopy and fruit exposure and reduce canopy shade. Lyre and GDC systems are two of the horizontally split systems. GDC systems may result in higher fruit exposure and increase the potential for sunburn in warmer production areas. Smart-Dyson and Scott Henry are vertical systems that can be used to reduce canopy density on higher-vigor sites.

Insect and Disease Problems

Chardonnay is highly susceptible to powdery mildew and Pierce's disease. Botrytis bunch rot susceptibility varies among selections: those with tight clusters are more prone to rot especially when preharvest rains occur. Leafroll virus and virus-associated graft incompatibilities are potential problems in some field selections. The use of certified planting stock is highly recommended.

shoot tips

Downy white; young leaves yellow-green with subtle bronze-red tinges.

Other Cultural Characteristics

Chardonnay is one of the first varieties to begin growth in the spring, which makes vines more susceptible to frost injury. Crop recovery from regrowth is usually small. In years when cool bloom temperatures occur a high percentage of seedless, shot berries can occur. Early maturity makes the fruit attractive to birds, and significant fruit loss can occur.

Winery Use

A wide range of wine styles can be produced, including sparkling wines. Wine characters are greatly influenced by fermentation variables and the use of oak in the winery. Climatic conditions, soil characteristics, and viticultural farming practices are the major factors influencing vine growth and potential wine quality. The most distinctive wines are produced in areas where the grapes can achieve full ripeness and yet maintain moderately high acidity. As in most growing regions of the world, grapes for the highest-quality Chardonnay wines are grown in the cooler climatic regions.

—Larry J. Bettiga