



# Clarion

**Authors: Kate Fessler, Drew Horton, John Thull, Matt Clark**

Clarion is a cultivar that has been evaluated at the University of Minnesota for over 20 years and has consistently produced high quality, dry white wines. It is marginally hardy in USDA Hardiness Zone 4 (most Minnesota grape producing regions) but has grown well in Iowa and Wisconsin (Zone 5).

## Fruit Characteristics

Clarion produces large, loose clusters averaging 119.8 grams, with individual berry weights of 1.65 grams. Clarion wine is of high quality and exhibits flavors of pear, melon, apricot, and chamomile. When fruit is especially ripe, wine aromas also include citrus and passionfruit, with hints of nuttiness and minerality.

## Hardiness

In USDA Hardiness Zone 4, Clarion is marginally hardy. Primary bud survival has been between 57-83%, but was only 4.2% during the Polar Vortex of 2014, when temperatures plummeted as low as -48F. Bud survival has been consistently higher in Zone 5 plantings in Iowa (between 76-88%). These vines are therefore recommended for growers that experience warmer winter conditions.

## Vigor

Clarion is considered a low-medium vigor vine, with an open, upward growth habit. As it is less vigorous than similar cold-hardy cultivars, it is easier to manage in the vineyard. Saving one sucker shoot to replace a trunk can lead to vigorously growing bull canes, especially on vines with large root systems. If trunk retraining is needed, keep a few moderately growing sucker shoots throughout the growing season to serve as replacement options for new trunks.





### **Bud Break and Harvest Timing**

Budbreak for Clarion occurs around the same time as Marquette, but blooms later than either Marquette or Frontenac. Clarion generally ripens after Itasca and before La Crescent, around mid-September. As fruit ripens earlier than some other *riparia*-based wine grape cultivars, it should fit well into current harvest schedules.

### **Harvest Parameters**

Clarion should be harvested between 22 and 24°Brix and 3.2 pH. Its total titratable acidity has been observed between 5.7 and 7.7 g/L, with malate levels of about 3.7 g/L.

### **Training Systems**

Clarion's upright growth habit and good cane structure are quite suited to Vertical Shoot Positioning (VSP) training systems. However, Clarion can be easily grown on a High Wire training system with less labor input. If grown in Zone 4, it is recommended to train vines with multiple trunks of differing ages to help the odds that at least one trunk will survive severe winter injury or vole damage. After being re-trained from the ground, this variety is back in good production by the following season.

### **Buds, Fruitfulness, and Cluster Arrangement**

Like Frontenac, Clarion's primary shoots carry 2-3 clusters, but those clusters will generally weigh less than those of similarly grown Frontenac. Mean cluster weights in Minnesota are between 92-127 grams, and average 69.7 grams in Iowa. Clarion yields an average of 1.7 tons/acre in Minnesota, 3.1 tons/acre in Iowa, and 5.4 tons/acre in Wisconsin. These numbers reflect some of the consistent cropping issues related to cold-hardiness (and are averaged for years where there was no crop following extreme weather events).

If primary buds have been injured by cold temperatures, secondary buds will bear some fruit. These secondary shoot clusters tend to weigh less than half that of primary shoot clusters, and usually only one cluster is born on a secondary shoot.



## Pruning, Shoot Density, and Canopy Management

Pruning strategies for Clarion should consider vineyard site, past weather events, and the condition of each vine at a particular location. Cane pruning Clarion is possible, but cordons with spurs are better buffered against harsh winters. Cane lengths should not exceed 10 to 12 nodes in length. This calls for tighter vine spacing at the outset of planting (less than 6 feet). Clarion performs well when shoots are pruned back to 2-3 bud spurs that are spaced evenly along established cordons. Cordons allow Clarion vines to fill in more trellis length (6 feet or more). At pruning, 6 to 7 'count' buds per foot of trellis should be retained to achieve an appropriate shoot density during the growing season.



Some shoot thinning of unexpected 'non-count' buds would be recommended early in the season, but bear in mind that Clarion's upright shoots may be naturally thinned from high winds in some seasons. As Clarion's shoots lengthen and become heavy with fruit, they will need some repositioning to keep the clusters sun-exposed for desired ripening goals. Clarion has minimal lateral (axillary) shoot development which contributes to its open growth habit.

## Pest Susceptibility

Clarion possesses a known disease resistance to downy mildew but is moderate susceptibility to powdery mildew and black rot. It is susceptible to leaf phylloxera, at similar levels to Frontenac. No botrytis infections have been observed on Clarion. Integrated pest management approaches that focus on managing powdery mildew before and just after bloom have been successful in the trial plots.