

# Cultural Practices for Princess

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Princess is a mid- to late-mid season white seedless table grape developed by David Ramming and Ron Tarailo of the USDA-ARS in Fresno, CA. Formerly known and tested as USDA selection C45-59, this cultivar was released in the spring of 1999 as “Melissa”. Due to trademark conflict, the name of the cultivar was renamed “Princess”. Princess resulted from the cross of Crimson Seedless and B40-208, an unreleased USDA selection producing white, seedless berries with muscat flavor. The cultivar produces large, greenish white berries that ripen in early to mid-August. The harvest period is just ahead of, or about the same time as Thompson Seedless. Clusters are conical with small to medium shoulders, and generally less compact than Thompson Seedless. Berry shape

is generally cylindrical or similar to table Thompson Seedless, although berry size may be greater with cultural practices. The berries are firm and have a slight floral or muscat character when fully mature. The commercial appeal of Princess rests on its large berry size, late maturity and excellent eating quality. There are approximately 2,200 acres of Princess in commercial production in California.

## Site Selection and Planting

Princess is highly vigorous on most soils suitable for table grape production in the San Joaquin Valley. Rootstock selection should be based on site-specific soil pest or soil chemistry problems. Although information on rootstocks is limited, recent research indicates that grafting to high vigor rootstocks such as Freedom and Ramsey may exacerbate problems of poor fruit set and early bunch stem necrosis (explanation below). For these reasons, the use of low vigor rootstocks may be preferable to the use of high vigor stocks. Vines are extremely vigorous when planted in deep, fertile soils. Excessive nitrogen fertilization and irrigation should be avoided. Vines are typically spaced 7' to 8' between vines and 12' between rows

## Training and Trellising Systems

Princess should be head trained and cane pruned for adequate yields. Some growers are also utilizing quadrilateral cordon training with a combination of spur and cane pruning, particularly when the open gable is used. Up to 12 canes per vine, depending on vine vigor and trellis system, are typically retained at pruning on mature vines. When quadrilateral cordon training is utilized, 36 to 40, 2 to 3-bud spurs are retained per vine.

Due to the cultivar's high vigor, a large expansive trellis such as the open gable is generally preferred compared to the standard "T" system. A major advantage of the gable trellis system is that more fruiting wood can be retained per vine compared to the standard system.

### **Productivity and Crop Load Management**

Information on commercial production is limited due to the relatively short production history. Yields typically range between 800 and 1,200 boxes (22 lb.) per acre. Mean cluster weight is typically one pound or slightly less, suggesting 50 clusters per vine or more are necessary to reach 1000 boxes per acre. Since the cultivar is moderately fruitful, cluster thinning may only be necessary in years of high bud fruitfulness and thinning should occur only after fruit set has occurred. Due to the moderate length of the cluster, cluster tipping is normally not necessary.

A potential problem with this variety is that natural berry set is highly variable among sites. In some vineyards, natural fruit set is excessive, limiting berry growth and resulting in tight bunches. In these cases, gibberellic acid bloom sprays are needed to reduce fruit set. In other vineyards fruit set is poor and yields are reduced as a result. In these cases methods to increase fruit set, such as shoot tipping, deficit irrigation or girdling at bloom may be warranted. Poor set is common in third and fourth leaf vineyards of high vigor. It appears that site-specific experience is necessary for the selection of optimum bloom treatments. Gibberellic acid sprays are not recommended for the first two crop years, allowing the natural shatter at the site to be adequately evaluated.

In vineyards with consistently poor fruit set, shoot tipping immediately prior to bloom may be used to increase fruit set. The shoot apex or tip is removed (2-2.5" of each shoot) a few days before the initiation of bloom when the first few open flowers are observed. While this treatment is highly effective for increasing fruit set it often produces tight, compact clusters. Additional cost for berry thinning and shoulder removal may result. Shoot tipping also limits the use and effectiveness of girdling and chemical berry sizing treatments.

Lastly, because of this variability in fruit set, it is generally recommended all crop load adjustments or cluster thinning be performed after fruit set, even in fruitful years. Based on a mean cluster weight of approximately one pound, acceptable crop loads range between 45 and 55 clusters per vine.

### **Girdling and Gibberellic Acid**

*Berry thinning.* Once gibberellin bloom sprays are deemed necessary, 0.5 to 1.5 grams of gibberellic acid per acre applied at full bloom is sufficient to reduce fruit set and increase berry length and weight. It is wise to begin with low rates (0.5 to 0.75 grams per acre) the first year and gauge treatment efficacy before using higher amounts. Rates greater than 1.5 grams per acre may result in excessive thinning and unacceptable reductions in yield the following year.

*Berry sizing.* Trunk girdles applied at berry set (4-5 mm berry diameter) increase the berry weight and yield of Princess 15% to 20%, but also delay fruit maturity. Girdles applied at berry softening or veraison advance fruit maturity, but have no effect on berry size. Effective rates of gibberellin for berry sizing between 10 to 20 grams per acre with applications normally timed at fruit set + 2 weeks to minimize negative effects on return fruitfulness. Research has shown that return fruitfulness is extremely sensitive to gibberellin and in most cases rates as low as 10 grams per acre applied two weeks following fruit set reduce both cluster size and number the following year. Rates above 20 grams per acre will result in acceptable reductions in yield.

### **Canopy Management**

Canopy management practices, including shoot thinning, sterile shoot removal, leaf removal around the clusters and summer pruning, should be performed as with Thompson Seedless. It is important to remove leaves in direct contact with clusters following fruit set in order to reduce the potential berry surface scarring. However, care must be taken to avoid excessive and/or direct sunlight exposure of clusters that results in ambering or browning of the berry surface.

### **Special Problems and Considerations**

In addition to the propensity for poor fruit set as described above, Princess is also susceptible to early bunch stem necrosis or inflorescence necrosis. This is a physiological disorder that results in the cluster stem shriveling and drying just prior to or shortly after bloom. In some cases the entire cluster is affected, while in others only the main rachis stem or isolated shoulders are affected.

Affected tissues initially turn purple or black, and then become brown, necrotic as they dry. Fruit set is reduced as a result, and affected clusters that remain on the vine appear straggly with large open areas (excessive shatter). Most studies indicate the disorder is regulated by environmental conditions near bloom. It is



most commonly observed on table grape in the San Joaquin Valley when daytime temperatures drop below normal during the bloom period. The exact cause is unknown. Some studies have indicated that the damage results from a temporary accumulation of ammonia in the rachis tissue, while others tie the problem to inadequate carbohydrate availability during bloom. At present, little can be done to correct or control the severity of the disorder. Similar to poor fruit set, this disorder is most severe on third or fourth leaf vines.